PERSONAL
COMPUTER
weekly NEWS
AUGUST 25·1984·No 75 50p

THE DEFINITIVE QL REVIEW

SPECTRUM
Better displays made easier

INTEGRATED 64
Big business for your Commodore

MEMOTECH EDITED
Add three utilities to your repertoire

ORIC IN ACTION
Fast and furious machine code program

64K User RAM
and not a bit less...

New Prices!
MTX 512
£275.00
INC VAT

The MTX512 comes with 64K RAM, expandable to 512K. Add to this another 16K VideoRAM dedicated solely to handling the screen memory, and you've got 80K. But how much user RAM is left when you're running high resolution graphics programs? Unlike other machines, the answer is still 64K, because the MTX512 uses the 16K VideoRAM plus a second processor – the Texas TMS9929A – to take care of screen graphics. The main processor used in the MTX512 is the Zilog Z80A, which gives the MTX Series CP/M compatibility – CP/M was written around the Zilog Series. And the Z80A inside the 512 operates at 4MHz.

Expansion is no problem with the MTX Series, because it is designed as an interlocking system – from the MTX512 up to the powerful Memotech Silicon Disc Systems.

MEMOTECH MTX512 MAJOR FEATURES

STANDARD I/O PORTS
- Variable rate cassette port (up to 2400 baud)
- Two joystick ports using Atari configuration
- Centronics-type parallel printer port
- ROM cartridge port
- Uncommitted parallel input/output port
- Internal ROM board port
- Hi-Fi output port
- 4-channel sound through TV speaker
- PAL composite video colour Monitor port

THE RS232 COMMUNICATIONS BOARD
(required for disc expansions)
- Two independent RS232 ports
- 60-way Disc Drive Bus supporting up to four 5.25 and/or 8 inch floppy disc drives, Memotech Silicon Discs, and Hard Discs

USER RAM
- Expandable to 512K in increments of 64, 128, or 256K

24K OF ROM *which includes:*
- MTX BASIC
- Noddy, a simple, text-handling language
- A powerful Assembler/Dissassembler – sections of machine code can be created and run by calling the Assembler from within BASIC
- The sophisticated Front Panel, which displays the contents of all registers (including the F flag register) and pointers during program execution
- All four languages can be used interactively with each other, and with the user

ROM EXPANSIONS *- up to 72K*
- MTX NewWord, a 32K word processing package
- Hisoft PASCAL, written specially for the MTX Series

THE KEYBOARD
- Full size, 79-key, full-stroke professional quality keyboard incorporating:
- Main Block with typewriter-style layout
- A separate 12-key numeric/editor keypad
- Eight programmable function keys (16 with shift)

GRAPHICS FACILITIES

HI-RES GRAPHICS MODE
- 256 × 192 pixel resolution plus
- 32 × 24 Text in 16 foreground and background colours
- All 16 colours (i.e. 15 colours plus transparent) are available on the screen together
- 32 user-definable easily controllable sprites
- 128 separate GENPAT statements providing a huge range of user-defined characters

TEXT MODE
- Text resolution is 40 × 24 characters plus
- 128 user-defined characters
- Eight user-definable virtual screens or "windows"

SINGLE 5.25" DISC DRIVE – £399.00 inc VAT

Comprising one Qume double-sided, double-density 500K drive, plus the Memotech Floppy Disc Controller Board, with power supply, expansion sockets, and sturdy aluminium case.

Single Disc System Software: MTX Single Disc BASIC extensions on ROM, plus Renumber, 40 Column Text and Graphics Screen, Binary to Hex to Decimal Converter, Data save and load plus five games.

For further information, please contact:

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CP/M is a registered trademark of Digital Research Inc.

MENU

August 25 1984 No 75

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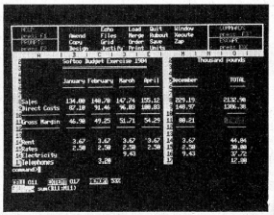
At last undongled, 'finished version' QLs are making their way to patient customers. Has the wait been worth it? How good is the software? Should you now join the queue? Is it a quantum leap or just a stumble forward? We answer all these questions and more.



The QL's flexible friend — Abacus — a spreadsheet that does it all.

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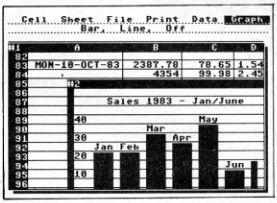
Tandy's Model 100 gives you portable computing — now a new plug-in box adds disk storage and interfacing for a desktop monitor. The best of both worlds?

SOFTWARE



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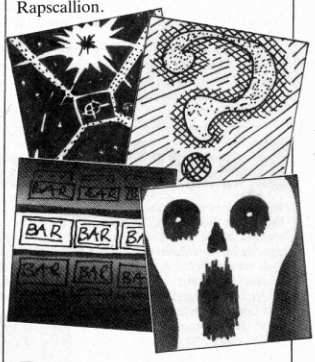

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We round up a handful of conversions for the BBC's younger sibling

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A lovable game listing — it's all in machine code so the action comes fast.

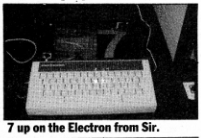
ACORN USER EXHIBITION REPORT

Show trials

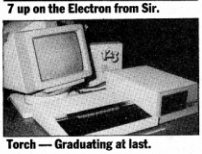
***PCN*'s Olympians Sandra Grandison, Nickie Robinson and Ralph Bancroft report**

At long last, the Torch Graduate made its debut at Olympia — but with a few teething problems.

For one, the system is supposed to run all IBM PC software, but a demonstration at the show proved that the popular Lotus 1-2-3 would be restricted without the extra graphics board to slot in. And if you're thinking of playing the Flight Simulator program from Microsoft on the Torch device, forget it, it doesn't run.



7 up on the Electron from Sir.



Torch — Graduating at last.

The Graduate comes in four models. The largest comes with the Xchange business application packages from Psion. You can pick up a Graduate G800/2 with 256K user memory and twin disk drives for £1,086. Torch says orders taken now are given a November delivery date.

Also on show was Unicomm, a communications package for the BBC. For £185 you get three software programs and a British Telecom-approved modem.

Cumana was showing two devices that could be useful in schools.

Magnet is a network system for the Beeb capable of linking 32 BBCs to a host micro. Driven via the RS423 port, it gives two-way communication between the remote stations and host micro, but in addition gives all the systems access to any peripheral devices attached to the host. A minimum eight-way system will cost £573.

The Touch Pad is a cursor moving device that is supposed to make programming easier. At £80 it comes with a booklet and can be operated by the touch of a finger.

Plug a Sir Mode 7 Adaptor into your Electron and you'll get full teletext graphics.

Sir Computers says the device is compatible with over ninety per cent of BBC Micro Mode 7 software and compatible with all Basic and OS commands. Mode 7 should be available by Christmas.

Cheap Beebs were also up for grabs at the show. Watford Electronics' special offer included a BBC, data recorder and five software packages for a knockout £326. Sir Computers pitched in with the offer of BBCs at £359.

Computer Concepts intends producing a couple of new products that should enhance the Beeb notably. The BBC Basic Compiler will cost £75 and be supplied as two ROMS — an 8K and a 16K.

Its ESP spreadsheet ROM will supersede Beebcalc and is expected to cost £55.

Marconi makes tracks

Marconi (MEDL) was testing its new tracker ball at the show. Depending on how popular it proves to be, the ball should be available in November for around £50.

Unlike earlier Marconi efforts, this won't look out of place on a desk-top. It has a beige body with a brown ball and three user-assignable buttons.

Approval holds up modems

There was a profusion of modems at the show including two new models.

The renamed Miracle Technology (0473-50304) was showing an improved version of its WS2000 world standard modem (issue 52) that can operate under software control.

The modem complete with connecting cables will cost you £184.

Miracle is still waiting for BABT approval, expected 'any day now'. So it is still illegal to connect the WS2000 to the phone system.

Also waiting for approval is OEL, the company that started the low-cost modem boom last year and whose products also appear with Prism, Oric and Watford Electronics labels on them.

Its latest model is a multi-rate modem that operates at 300 and 1200 baud.

It also has an auto-answer capability as standard.

OEL was showing the modem but not taking orders. When it does go on sale it will cost £175.

Beautiful movers

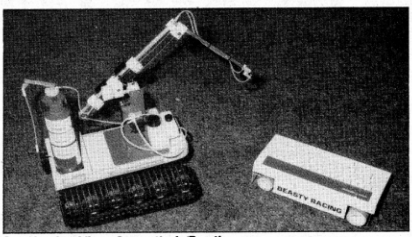
It certainly was all commotion on the Commotion stand. There were several bright red Beasty arms moving in synchronisation, lifting and moving objects from one position to another.

One of these arms was connected to a Beasty Mobile Base, Commotion's latest product. This base, which costs £60, carries 6.5kg, climbs a 45 degree slope and reaches speeds of up to 5mph.

Commotion had also rigged up the 'world's fastest Electron' by taking the insides out of an Electron and replacing them with a Beasty, servos and a large electric motor. But the most interesting, if not the most eye-catching, thing on the stand was the EV1 Electronic Vision System which costs only £129.95. This tiny, toy-like camera, despite its size, produced a very convincing moving picture. The resolution is low and for a fairly quick reaction it is best to have the picture purely black and white (you can get a picture with eight grey levels). Commotion's manual even claims you could make a short film. This is debatable.

The camera has accompanying software which allows you to get the eight grey levels, manipulate pictures, detect image changes and so on.

PCN will Pro-Test it in a forthcoming issue.



Armed and mobile — Commotion's Beasties.

IN BRIEF

IBM turns on the power

IBM's new PC duly appeared last week but so far there have been no reports of competitors jumping from high windows in despair.

The PC AT (for Advanced Technology) is bigger and faster than the XT but overlaps with it in cost. For $3,995 you get 256K and 1.2Mb on a floppy disk drive. A larger model, at $5,795, has 512K and 20Mb on a hard drive.

Launched with the machine were items of software to handle windows, multiuser (three) support, and a local area network that links up to 72 PCs.

Sirius support assured

Victor Technologies, striken US maker of the Sirius, has passed into the Swedish hands of Datatronic. This is a turnip for the books.

Datatronic has already held talks with ACT, distributor of the Sirius in the UK, and it looks as though nothing will change from the point of view of UK users.

'We do anticipate continuing to distribute the product,' an ACT spokesman said. 'We are committed to supporting it in the future — there are 25,000 of these machines in the marketplace.'

But demand for the Sirius has plunged from a peak of 1,400 a month to 300/400 a month now.

Quantum queue jump

When is 21-day delivery a very special offer? When you're talking about the Sinclair QL.

Coming to the end of its famous back-log, Sinclair has started mailing owners of ZX81s and Spectrums with the offer of faster delivery of a QL. 'Twenty-eight days is still the standard,' said a spokesman, 'but 21 is a special offer for people who have already done business with us.'

In at least one case the faster delivery has been promised as a response to a customer's cancellation — this, also, falls into the category of 'doing business' with Sinclair.

More Rabbit than Tesco

The Rabbit lives to run another day. The liquidator of Rabbit Software has put all the company's assets up for sale by tender. Included in the list is a stock of 200,000 games cassettes and the right to use the name Rabbit.

Anxious for a quick sale liquidator Stuart Edgar organised viewing days at Rabbit's Wealdstone, Middlesex premises for Monday and Tuesday this week. Sealed bids for the assets must be in by Friday.

The extent of Rabbit's debts has been contested by creditors who are taking legal action to overturn Mr Edgar's appointment as liquidator.

Dragon boost

By Ralph Bancroft

The sale of Dragon Data's assets to Eurohard of Spain (issue 74) could turn out to be a bigger boost for Dragon users that first appeared.

Eurohard, and its sister company Eurosoft, were set up with the specific intention of manufacturing the Dragon in Spain as the spearhead of Spain's move into information technology.

It is Spain's only microcomputer manufacturer and has received official backing from the Spanish Government, both financially and through the support of official agencies.

In addition, Eurohard has negotiated a deal with TVE, the Spanish television station, to run a series of 30 programmes on micros that will feature the Dragon in the same way that the BBC micro has featured in this country.

Eurohard is also bidding for a major contract to put micros into Spanish schools. As Brian Moore, managing director of the now defunct Dragon Data, put it 'as Spain's only microcomputer manufacturer I don't fancy the chances of Commodore and the like.'

If, as seems likely, Eurohard wins the contract, it will secure the future of the Dragon 32 and 64 for several years to come.

A number of UK software houses are already writing educational software for Spanish speaking countries and there is a good prospect of software written for El Dragon appearing in English language versions.

Mr Moore, now managing director of Touchmaster, the company that will be giving advice and assistance to Eurohard in its early stages of operation (issue 74), doesn't envisage problems over supplies to the UK.

'We have already started shipping production and testing equipment and I am confident.'

As well as the rights to Dragon, Eurohard acquired manufacturing plant and a large stock of partly assembled and completed machines.

GEC, which will continue with distribution in the UK, already has a stock of Dragons ready for distribution and has bought more from Eurohard.

Eurohard is headed by Eduardo Merigo, president of VISA Spain, the banking organisation. His involvement is more than coincidence.

Spanish banks have for some time run promotional schemes to attract investors. Depending on the amount you deposit you get free gifts of bicycles, videos and cars.

The latest promotional scheme is to give away home micros. And what better than a micro built in Spain?

Cheetah plugs in the RAT

The world's first infra-red joystick will be launched today (Wednesday) by Cheetah Marketing.

The joystick, known as the RAT, will connect to the computer via a plug-in module which reads and decodes the IR signals. As with the IBM PCjr's keyboard, this innovation will probably lead to computer games being played from the other side of the room or while in a reclining chair.

Cheetah hopes to make the RAT available through a number of high street shops. So far it hasn't had a price placed on its head but *PCN* will review it in full soon.

Cheetah will also announce the launch of a number of new games for the Sinclair Spectrum, including one from US software company Imagic.

Atari prices tumble down

Atari has taken the hint from a London store (issue 74) and knocked down the prices of its XL range.

Now you can pick up a 600XL for £99.99 and an 800XL for £199.99 anywhere — savings of £60 and £50 respectively. Other reductions on Atari products include the 1010 recorder for £34.99, a 1050 disk drive for £199.99, and 1020 colour printer for £99.99, a 1027 letter quality printer for £199.99, Trak Ball for £19.99 and a Touch Tablet for £49.99.

These price changes are just the start of the company's shake-up — its priority is to capture a major share of the computer market.

OVER THE TOP — October should see the arrival of Sanyo's MPC 100 MSX micro in the shops with a price tag of £299.95.

Facilities are included for using a light pen with the machine together with sockets for a Centronics printer, monitor, audio, TV and joysticks.

Toshiba (issue 74) has also released details of its HX-10 this week. The HX-10 has all the normal MSX facilities such as 16 colours and three channel sound. Toshiba has given its MSX machine a slightly lower price tag than Sanyo's, around £280, but no official launch date.

No surrender, says Oric

Rumours of an early bath for Oric Products International have reached such a pitch that the company has issued a statement to combat them. In the past week Oric's debts have been put as high as £4 million, and it has even been suggested the company might pull out of the UK market. And Oric has helped things along by cutting 15 staff at its Ascot HQ.

Oric concedes that the redundancies have taken place, but points out that there have been 15 new recruits to its operation in Europe, and claims no more redundancies are envisaged. The company refutes absolutely suggestions that it is planning to pull out of the UK market. 'Although Oric is doing very well in Europe,' says the statement, 'Oric is a British company and recognises the need to maintain a position in the UK, which is the centre of the European computer industry.'

To allay fears about liquidity further, Oric is claiming $2.75 million worth of orders for its new German keyboard for the Atmos. These have gone to Germany, Austria and Switzerland, with $2 million made up by two major German retail chains.

Making 15 staff redundant may seem an odd way to prepare for a Christmas micro boom, but that appears to be precisely what Oric is doing. An Oric source told *PCN* that redundancies were originally only intended to be about four or five in the secretarial section, but in the event the number was larger, and is pretty well across the board.

Oric is still banking on an autumn upturn in sales and according to finance director Allan Castle, is ploughing its resources into manufacturing, but the company is still on the receiving end of discounting in the major retail chains. Just a few weeks ago Oric increased the price of the Atmos by £20, but prices in the shops are still around the £150 level, rather than the £190 Oric would like.

VIEW FROM JAPAN

Innovation doesn't come second hand

By Stomu Ng

When they're scraping the barrel the question on everybody's lips is: 'Can the Japanese move beyond imitation of Western technology and develop something world-beating of their own?'

This is mainly asked with the famous fifth generation of computers in mind. The fifth generation, you will know by now, is the means by which we develop computers of such awesome power that no task will be beyond them. Once the fifth generation machines get into their stride many of our great outstanding problems will be solved — the first biscuit in the packet will not crumble, chewing gum won't lose its flavour on the bedpost overnight, and all tables will have legs of precisely equal length.

Disregarding the fact that the fourth generation has made virtually no impact — apparently great leaps forward in computer development skip a generation, like alcoholism — Japan is pressing ahead with the fifth. It has been remarkably open in talking about what it hopes to achieve and it has even gone so far as to invite decadent Westerners to submit proposals for contributions.

But ever since the fifth generation was first publicly discussed three years ago, Westerners have looked askance at it, regarding it as the final piece in Japan's design for world domination of the computer industry (and hence of all other industries). The UK's response is typical: a committee (and probably the appropriate number of sub-committees) will dole out cash to anybody with a piece of research work to fund. Meanwhile Sir Clive announces that Sinclair Research will provide the UK with fifth generation technology, have no fear. The result will be a large number of IBM-compatibles by courtesy of Government money and a semi-intelligent electric Morris Traveller from Sir Clive.

None of this will matter if the Japanese prove themselves incapable of real innovation. They have such a long history of reliance on Western technology that they may be unable to kick the habit.

When did this reliance start? Probably last century, when it dawned on the Japanese that this was the age of the train. British railway engineers, who in those days would turn any mephitic swamp or barren dustbowl into a marshalling yard at the drop of a hat, duly obliged.

This came in handy not long afterwards when Japan was able to stage an even more impressive demonstration of what it could do with someone else's technology. Around the turn of the century there was a little unpleasantness with Russia, and in the absence of the UN, divine intervention or ACAS the Imperial Russian Baltic Fleet sailed round most of the world intending to black the upstart Japan's eye. On arrival it suffered the worst rout since the Spanish Armada. We weren't told whether some cucumber-cool Japanese commander insisted on finishing a game of Majong before setting sail to deal with the Russians, but it seems more likely that the European-built ships possessed by the British-trained sons of Nippon were what made most of the difference.

Since then, the story has become familiar around the world. What the Japanese do best, it tells us, is exploit the technology developed by white Caucasians (nothing to do with Russia, by the way) who are assumed to enjoy a monopoly on inventiveness. In view of the success of Japan in the last few decades this might seem to be enough, but now there's the prospect of Japan taking the initiative.

Does it have the capacity? If throwing money around is the answer, clearly it does. If organisation — co-ordination of effort — is the answer, again it obviously does. But what about the creative spark?

There must be more doubt on this score. You have only to look at the Japanese approach to home computers — MSX Basic and a Z80. Then there's the relatively slight use they make of a technology that is by definition perfect for them — Uncommitted Logic Arrays. ULAs are totally inscrutable. Where other chips can be bought, imitated, second source, etc ULAs are so impenetrable it isn't worth trying.

So what are the chances of fifth generation computers first seeing the light of day in Japan? My guess is that it will depend on how much help they get from the rest of the world.

ASA tackles Watford

BBC micro specialist Watford Electronics has achieved the dubious distinction of three separate mentions in the latest report from the Advertising Standards Authority (ASA).

Two complaints, concerning the price of its disk interface kit and the legality of its modem, were upheld by the ASA. A third complaint, about the compatibility of Watford's disk filing system ROM with Acorn's DFS, was turned down by the ASA after taking technical advice.

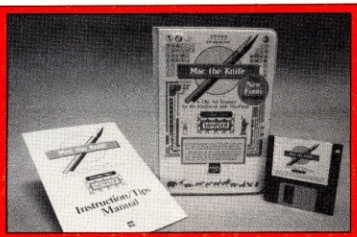
Watford fell foul of the ASA on its modem because the law requires any advertiser of equipment designed to be attached to the telephone system to make clear whether or not the equipment is approved for that purpose. At the time of the complaint Watford had not received approval.

Watford has since told the ASA that it has obtained the required approvals and that future advertising will carry the appropriate 'approved' symbol.

On its disk interface kit, Watford slipped up by advertising the price as £95 and then charging someone £150 for it.

Watford told the ASA that it did mention in the advertisement that prices were subject to change without notice. The ASA countered that it was 'nonetheless concerned that the advertisers had chosen to advertise the product at a price which could not necessarily be maintained'.

The company has given an undertaking that future adverts would indicate that the price would be available on application.



MAC ON THE DRAW — Macintosh users who want to sharpen their work up should test drive *Mac the Knife*. For £34.44 you get a colour binder, 400K of clip-art on a 3.5in disk and an instruction manual. Mac the Knife is a collection of pictures, icons, borders, tools, maps and textures stored in MacPaint files. The idea is to clip Mac the Knife images and paste them into your files. Contact P & P Micro Distributors, 0706 217744.

Epson loses favour with DRG

Is the writing on the wall for Epson printers, the workhorses of the industry?

There have been pretenders to Epson's crown before, but last week came the first signs that disillusionment was setting in. DRG Business Systems, a distributor of Epson printers, has decided to take a chance on a little-known alternative rather than stay with Epson.

In future DRG's dealers will be trying to interest you in Seikosha printers and in something called the Ensign 1650 from Nakajima of Japan. This is a 165 cps 80-column dot matrix unit that costs £344—the nearest Epson equivalent, the FX-80, costs £438. But more significantly to DRG, Epson's profit margins are tighter, thereby dampening the retailers enthusiasm.

A spokesman for Epson said: 'We're sorry that DRG has made that decision.' He added: 'There are new manufacturers coming into the market all the time and that will put pressure on us. But there are a considerable number of dealers trading on our usual terms who are quite happy.'

Microdrive input

The sight of Microdrives arriving in the shops (issue 55) seems to have spurred business software suppliers to take a renewed interest in the Spectrum.

Hestacrest plans to release the first modules of an integrated business system in early September. Each of the four programs will cost £32.50 and there will be discounts if you buy two or more modules at the same time.

The company has taken an uncompromising stand against program copiers — for £9.50 each it will supply back-up copies of the modules.

The full system will include a Cash Book, Sales, Purchase and Nominal Ledgers with full audit trails, a 64 character per line display and 80-column printout facility.

The programs use twin Microdrives, can be run independently and can process up to 40 batches and 1,000 transactions per month.

The programs will be available by mail order from Hestacrest, PO Box 19, Leighton Buzzard, Bedfordshire LU7 0DG. Tel: 052-523 7785. The Nominal package is likely to be later than the rest, Hestacrest says.

ZX81 takes a Memo-tech

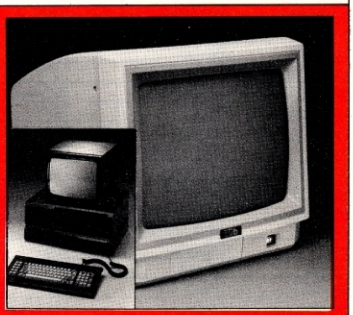
By John Lettice

Memotech plans to offer ZX81 owners the chance to trade in their machines for a Memotech 500. If the exchange deal gets off the ground it will be possible to trade in a ZX81 and any Memotech ZX81 add-on packs you have as part of the cost of a 500.

Provisionally, a £25 allowance for the ZX81 and half the purchase price of Memotech add-on packs is being considered, but as Boots is currently discounting the ZX81 to £19.95 ('buy a 500 and we'll give you six quid,' as a Memotech spokesman ruefully put it) the allowance is liable to be a little less.

The official Memotech users' group is now also under way, and the first issue of Genpat, the group's magazine, is currently in preparation. Members of the group, which is to be known as Memopad, will get first news of new software along with the magazine.

The users' group is being organised by Keith Hook, famous for his regular assembler articles in the pages of this very magazine. So, if you want to join, send £16 to Memopad, 3 Bulcock Street, Burnley, BB10 1UH.



TWIN CUBS — Microvitec, not content with the Queen's Award for Technological Achievement, is chasing a Design Council Award. The famous Cub range is now available in an 'elegant, new moulded cabinet . . . aimed at business and home users'. By implication the inelegant, old metal-cased version is consigned to 'more rugged applications', for example with the sturdy Advance system (inset). In practice the style you choose will probably depend on the colour of your machine rather than the use you are putting it to.

Prism scraps software

Some micro users may find new software in short supply over the next few weeks following Prism Microproducts' withdrawal from software distribution.

Prism's closure of its software merchandising operation is not totally unexpected (issue 72) and comes shortly after it lost its contract to supply Green's.

In the short term there could be supply problems for its other two major clients, Rumbelows and Laskys. But both companies are optimistic that their shops can meet demand until new arrangements are made.

'I don't think there will be any hiccup,' said Philip Halton, Laskys' micro manager, 'most of the software in our shops is all new products.

'We are talking to a number of people who are prepared to move in very fast. By the end of the month we will be able to offer a completely new service,' he said.

'I see no disruption at all,' said Peter Jackson, Rumbelows' marketing director. 'We have plenty of software in stock.' It has already negotiated a new distribution agreement with Thorn-EMI, its parent company. 'It has been looking at a similar kind of operation for some time,' he said.

'If anything our service will expand rather than contract,' he added.

Richard Hease, a Prism director, said the reason it pulled out of software merchandising was the low level of sales in the shops it was servicing.

SOFTWARE

The new releases

Games

Commodore, Spectrum: Kind to animals? Can't pass a dog without patting it on the head? A new game from Channel 8 (0772 53057) for the 64 and the Spectrum should test you to the limit — in Borzak the Bug-eyed Monster from Betelgeuse you have to help out the kind of character that is normally the baddie. It costs £6.95. For the same two machines Shards (01-591 7666) has released The Pettigrew Chronicles, a family adventure developed from forerunners on Dragon and Acorn systems. It promises £9.95 worth of good clean fun. Shards has also converted Empire for the 64, for £6.95, and has produced Galilee, a sequel to Jericho Road, for the Spectrum at £5.75.

Spectrum: Fans of the TV show Terrahawks will be able to load the program on to their Spectrums from the end of the month. CRL (01-533 2918) hopes to have it in the shops at £6.95.

Amstrad: Maverick Amstrad software supplier Kuma (07357-4335) has released Holdfast, a non-violent simulation game, and Gems of Stradus, a colour graphics adventure. These cost £5.95 and £7.95 respectively.

Macintosh: Less a game, more an entertainment from Pete and Pam (0706-217744) with Composer for the Apple Macintosh. P&P describes this as a music editing program and claims that it is as easy to use as a Macintosh. It costs £429.

Education

Oric: The Software Scheme inaugurated by Oric (0990-27641) now includes two items from the Kindersoft range, Four Games for Children and Three Games for Children. The fourpack, for five to 10-year-olds, covers addition, subtraction and spelling. The pack of three is designed to appeal to even younger users. Both cost £6.95.

Acorn: For both the BBC and the Electron Acornsoft has released Podd, Squeeze, and Jungle Puzzle. Podd concentrates on the alphabet, Squeeze on shapes, and Jungle Puzzle is a descendant of the dreaded puzzle cube. They cost £9.95 each, or £11.50 on disk.

Business

Hewlett-Packard: Claremont Controls (0669-21080) has adapted its Hornet project management system to run on the touch-screen H-P 150. Hornet can take data from other software, for example dBase II or 1-2-3, and can output it to other packages or use it in its own processing.

Apricot: Lotus Development's UK software team is implementing 1-2-3 on the ACT Apricot range, for release in October. The package costs £375. ACT itself has added Prestel to the range of functions it can offer on the Apricot. The one-off price is £145 plus VAT.

Commodore: Bubble Bus (0732-355962) has taken over marketing the business software products of its offshoot, The Computer Room, and the first package to be transferred is Supernews, for newsagents with 64s. The program costs £499.

CP/M, MSDOS: Typefit is a product for publishing designers, giving a range of fonts and an accurate line-count so that text will fit the space on a page. From Anvil (0458-45359) it costs £300.

MSDOS: Microsoft has enhanced its range of programming languages with new versions of Fortran and Pascal able to support the 8087 maths co-processor and a version of muLisp that has been tailored to run on 8086/8088 based machines.

Apple/IBM: BFI Electronics (01-941 4066) is distributing a new product from Verbatim called Disk Drive Analyzer. It is designed to test and display a diagnostic report on your disk drives.

PCN CHARTS

GAMES

NEW WEEKLY CHART! NEW WEEKLY CHART

			GAME TITLE	PUBLISHER	MACHINE	PRICE
▶	1	1	Full Throttle	Micromega	SP	£6.95
▲	2	3	Sabre Wulf	Ultimate	SP	£9.95
▼	3	2	Match Point	Psion	SP	£7.95
▲	4	7	Beach-head	US Gold	C64	£9.95
▲	5	6	Jet Set Willy	Software Projects	SP	£5.95
▼	6	4	TLL	Vortex	SP	£5.95
▲	7	9	Arabian Nights	Inteceptor	C64	£7.00
▶	8	8	Stop the Express	Sinclair	SP, C64	£5.90
▼	9	5	Lords of Midnight	Beyond	SP	£9.95
▲	10	12	Psytron	Beyond	SP	£7.95
▶	11	11	Mugsy	Melbourne	SP	£6.95
▲	12	20	Micro Olympics	Database	SP, C64, AC	£6.95
▲	13	—	Potty Pigeon	Gremlin	C64	£7.95
▲	14	15	Encounter	Novagen	C64, AT	£8.95
▼	15	13	Trashman	New Generation	SP, C64	£5.95
▼	16	14	Loco	Alligata	C64	£7.95
▲	17	28	Valhalla	Legend	SP,C64	£14.95
▲	18	23	Tank Duel	Real Time	SP	£5.50
▲	19	—	Decathlon	Activision	C64	£9.99
▼	20	16	Fighter Pilot	Digital	SP	£7.95
▼	21	19	War of the Worlds	CRL	SP	£5.95
▲	22	—	Rapscallion	BugByte	SP	£6.95
▼	23	18	World Cup	Artic	SP	£6.95
▼	24	10	Jack & B'stalk	Thor	SP	£5.95
▲	25	30	Caverns of Khafka	US Gold	C64, AT	£8.95
▲	26	—	Worse things happen	S/Soft	SP	£5.95
▲	27	—	Atik Atak	Ultimate	SP	£5.95
▲	28	—	Blagger	Alligata	C64, AC	£7.95
▼	29	25	Frak!	Aardvark	AC	£7.50
▲	30	—	Solo Fight	US Gold	C64, AT	£12.00

MICROS

Top Ten over £1,000

TW	LW	MACHINE	PRICE	DISTRIBUTOR
▶1	1	IBM PC	£2,390	IBM
▶2	2	Apricot	£1,760	ACT
▲3	7	Compaq	£1,960	Compaq
▼4	3	Apple III	£2,755	Apple
▶5	5	Televideo TS1603	£2,640	TH
▲6	8	Wang Professional	£3,076	Wang
▼7	4	Sirius	£2,525	ACT
▲8	—	Kaypro	£1,604	Kaypro
▶9	9	Philips P2000 c	£1,484	MD,KDS
▲10	—	NCR Decision Mate V	£1,984	NCR

Top Ten up to £1,000

TW	LW	MACHINE	PRICE	DISTRIBUTOR
▶1	1	Spectrum	£99	Sinclair
▶2	2	Commodore 64	£199	CBM
▲3	5	BBC B	£399	Acorn
▶4	4	Vic 20	£140	CBM
▼5	3	Electron	£199	Acorn
▲6	7	Memotech 500	£250	MTX
▲7	—	Amstrad	£229	Amstrad
▲8	9	Oric	£99	Oric
▼9	8	Atari 800XL	£250	Atari
▶10	10	Dragon	£150	Dragon

These charts are compiled from both independent and multiple sources across the nation. They reflect what's happening in high streets during the week up to **August 15.** The games chart is updated every week.

Neither mail order nor deposit-only orders are included in these listings. The prices quoted are for the no-frills models and include VAT.

Information for the top-selling micros is culled from retailers and dealers throughout the country and is updated every month.

PCN Charts are compiled exclusively for us by RAM/C, who can be contacted on 01-892 6596.

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- Sampling rate 30kHz: 15kHz bandwidth.
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- Three FREE software updates included in system price.
- Complete sequencing programs: Real-time, Step, Full chaining, edit and storage on Floppy Disc.

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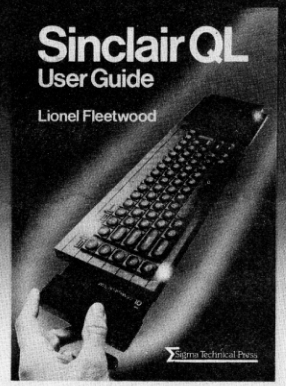

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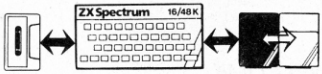

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GOTO gets a boost from a fan

I feel bound to fly the flag for GOTO. Why, apart from a warped sense of purism, do so many home computing writers so roundly condemn the humble GOTO statement? Simon Williams, in his otherwise excellent article comparing BBC and Locomotive Basic (issue 73) is at it again, referring to the 'infamous GOTO statement'. I put it to the readers of *PCN* that the infamy of the GOTO statement exists only in the mind of the purist.

As one who writes a great deal of software of one sort or another, I find the delights of structured programming much overrated and, to be honest, not particularly useful. All it seems to do, when applied, is to demand more memory than there is or at least use more than you'd like, thus limiting what can be done with a single program. I mean complex programs, not simple small routines.

I heartily wish those who keep advocating the removal from Basic of the GOTO statement would consider its real usefulness.

I never advocate the use of backwards GOTOs, and avoid them if I can, but for practical, not theoretical reasons. Even here, though, there is sometimes no better way to re-run part of a program than to use one. And again, if GOTO were removed, what would replace it? I do not believe there is never a time when an unconditional branch is necessary.

I do, however, support Simon Williams' contention that WHILE . . . WEND is a more useful structure than REPEAT . . . UNTIL, especially when it can be nested.

What I have seen of Locomotive Basic suggests to me that it will prove an excellent dialect, but even that suffers from the need to place space around keywords, which is another structured feature that wastes memory.

Like all programmers, I suppose, I would not consider my creations especially good, or particularly marvellous, but I do like them to work. The effort involved in trying to write programs without the GOTO statement would surely be too horrendous to contemplate.

P Craddock,
Walsall.

Simon Williams, like all PCN reviewers, is allowed to express his opinions, but I side with you, Mr Craddock. If it works, don't mess with it. —Ed.

PCN £10 Star Letter

Sad lack of support for Sord M5 users

In all computer magazines and games program magazines, there are always plenty of ideas for Spectrum, Commodore and other leading micros, but very little or no mention is made of the Sord M5. I, and I suppose other M5 users, look at computer magazines and if there is nothing in them for the M5 put them back on the shelf.

With so many on sale you'd think at least one magazine would have the foresight to capture the 'fringe' micro market and build up a following — after all Spectrum and Commodore have their own 'house' magazines.

I suggest that L Rumens (issue 70) and other M5 users write to CGL as I have done, and ask for more information so we can write our own programs etc, for magazine publication. CGL could publish their own 'house' magazine, or is it a case of 'you had a choice, we've got your money'?

Hugh Taylor,
Dundee, Scotland.

Schools don't teach BBC Basic on BBCs

I'm a BBC owner of a year and a half and a strong believer in structured programming using the rich command set of BBC Basic.

However, I am concerned that unknowing parents are being pushed into buying an Electron or BBC Micro for their children because schools use BBCs. We've all seen the ads in the Sunday supplements and on TV saying that BBC Basic is the 'leading language in schools'. This is an inarguable fact but — and it's a big but — the way Basic is taught in schools makes this meaningless.

In my experience, even if a school or college uses only BBCs, Basic is taught very much as it has always been. That is, the ELSE for IF . . . THEN is often not mentioned, variables used are often single letter rather than meaningful names and as far as procedures and multi-line functions go — forget it.

All the advantages of BBC Basic are ignored and, in effect, once familiarised with operation, children could apply their knowledge to any machine.

My advice to parents is buy the best they can afford, choose a well-supported machine and, most of all, encourage your children to extend their knowledge at home.

Finally, just to prove I'm not anti-Acorn, the BBC is still an excellent machine (if overpriced and starting to look old fashioned) and even the Electron has some good points.

M Norton,
Stirchley, Birmingham.

Are home micros a passing phase?

The many local home computer users I am in touch with all agree on one thing: the future of the home computer lies in the past.

The idea that the home computer has any part to play in the domestic environment is another way of building castles in the air. Of course we shall see many domestic devices with EPROMS and keys for SELECT, OPTION, Start and Stop, but these will be a far cry from a home computer.

It is, for instance, far quicker to look up a printed telephone directory, or cookbook, etc, than to load and find the same item on your computer, even from disk, and who on earth will spend £300 plus for such a slow system?

No-one is surprised to see the software houses now coming to a sticky end, and many computer publications may follow. The software houses had, perhaps, half a dozen routines which they dressed up with slightly different sprites each time for a new game, which might interest a more or less intelligent child for about ten minutes.

The future, such as it is for the small computer, is undoubtedly in the small business area — if easy to use, account keeping, stock ordering, inexpensive machines can be produced and marketed.

And why do I still have a home computer? Well, I am a radio amateur. It enables me to communicate over the air with radio teletype, machine sent morse code, AMTOR, and to exchange data with fellow amateurs, both directly and via satellite.

R Davis,
W Bridgeford, Notts.

You've found a use for your micro, the rest of us can do likewise. — Ed.

Teaching with Logo is the answer

In reply to the article entitled 'Survey slams micro use' (issue 73): yes, 99 per cent of educational software is rubbish, and a waste of time and money. The answer is contained in one word — Logo.

Let the children program the computer in Logo, instead of having the computer program the children. Giving users an infinite number of variables with a creative and interactive language is what it's all about.

John Cunliffe,
Withington, Manchester.

Amstrad falls down on documentation

I am the proud owner of a new Amstrad CPC464 colour computer. I think the machine is excellent.

But the user manual (once again) leaves a lot to be desired. My main quibble is that you are given no memory map at all, no POKE or PEEK addresses.

Like a fool I thought the Concise Basic book would contain the needed information. But after forking out £20 all you get is a glorified version of the User's Instruction Manual which is supplied with the machine.

I've written to Amstrad asking for a memory map but I'm still waiting, as per usual. Why oh why do manufacturers keep spoiling things when they produce a great machine for a great price and then fall down on literature.

Gordon Tomlinson,
Stapleford, Nottingham.

Air your opinions, share your experiences or just point out our occasional blunders. If you have an impressive way with words you may gain £10 for the star letter.

WRITE TO: Random Access, *Personal Computer News*, VNU, Evelyn House, 62 Oxford Street, London W1A 2HG.

ROUTINE INQUIRIES

Lost in a maze of bits and bytes, trapped in a forest of errors, bugged by Basic? Whatever the problem, CALL on us. Our panel of experts is at your command.

Write to: Routine Inquiries, *Personal Computer News*, VNU. Evelyn House, 62 Oxford Street, London W1A 2HG.

Upgrade ideas for the Amstrad

Q I have just bought an Amstrad CPC464 and hope you can help me with a few questions. Will it be possible to upgrade the memory, and will it be possible to use the Amstrad with a modem?

I have heard that when the disk drives are released the Amstrad will be using CP/M version 2.2 — is this correct, and how much free RAM will this leave?

D Parker,
Edinburgh, Scotland

A You won't be able to expand the RAM from 64K, but you can expand the ROM using the expansion port. As the Amstrad has no RS232 port, you'll have to look to a third party supplier for an interface if you want to use a modem. This will probably use the expansion port. The Amstrad will be using CP/M 2.2 and this will leave about 44K RAM for programs and data.

Intelligent programming queries

Q Could you tell me the address of Intelligent Software, and secondly, is it possible for *PCN* to compile a list of software houses with an address and what type of games they are after?

Also, as I don't program very well, but have three prototype games, could you say whether they only want cassettes or if they are interested in adventure, strategy and arcade type games, and possibly board game conversions.

Lastly, I do a lot of writing, and am looking for a computer that can assist me, but most computers are 80×25 lines, whereas A4 paper is about 68 lines. So is it easy to tell the printer to print so many lines down, use new paper with the page number on top, and so on, and do this for 10-15 pages?

A Dixon,
Walsall, West Midlands.

A Intelligent Software is at 21 Store Street, London WC1.

The problem with compiling a list of software houses is that it's difficult to keep it up to date, and it's really a very specialised task, too specialised for a general magazine like *PCN*.

It's not altogether clear what you mean by your next question. Some software houses will take ideas for programs, but it's best to finish off what you're doing, then send them finished tapes. Conversions are generally difficult, as the person who owns the copyright of the game will generally want either to commission someone to convert it or to sell the rights to convert it. Whatever you do, don't go converting games, board or otherwise, without the permission of the owner.

You seem to have totally misunderstood the concept of screen displays. A computer will often display 80 columns by 25 lines at any one time, but all you're doing is printing those lines on the screen, and you can always scroll them up.

Think of a printer as just another sort of display. So an 80-column printer will print 80 columns by as many lines as you've got paper for. Numbering pages simply involves the computer software counting the number of lines that make up a page, sticking a number on it and skipping on to the next page.

If you're looking for a reasonably cheap starter computer that'll allow you to upgrade to word processing, you might like to look at the Commodore 64 or the Amstrad.

Send assembler about its business

Q Me and my friends are into C, Pascal and 68000 assembler on the BBC, Electron, Oric, Spectrum, Commodore 64, Vic 20 and Atari. Our manager has given us two weeks to list our programs. Can you tell us how?

Small Business Computer Users Club, Manchester.

A Mere mortals are under the impression that the only way you can run 68000 code is on a 68000 machine, but those in the know can run it on as little as a couple of old radiogram valves with just a few small hardware modifications.

We wonder if the method you used involved the rusty nail and the brandy butter, or whether you've sussed out something of your own?

At present you can run C only on the Dragon 64 (under OS9), the Commodore 64 (from Aztec) and (soon) the Spectrum (Hisoft). The only home computer you can run 68000 code on is the QL, and although that uses the 68008, the instruction sets are the same.

Bright ideas for Oric colours

Q Is it possible to change the brightness of the Oric colours via a machine code routine?

The Spectrum and many others use a command like 'bright', but this command doesn't appear in Oric Basic.

Fraser Norman,
Dartford, Kent

A You're right — there's no reserved word for changing pixel or character brightness, and the attribute system doesn't cater for this feature. There are two commands in the Oric ROM — NORMAL and INVERSE (COF1 to COFD) — but for some reason these have no effect as the ROM ignores them.

However, you can get a sort of inverse colour effect with characters by adding 128 to the ASCII code of the character you want, then passing that value to PLOT, as in 'V=ASC ("A")+128:PLOT 2,0,V'. Adding 128 simply sets bit 7 (the high or most significant bit) of the character byte, which should reverse fore- and background colours for that character cell. CHAR resets bit 7 to zero, so you can't use the trick in HIRES. PRINT also does this, which means that if you want to display long strings you're stuck with PLOT, a FOR . . .NEXT loop and MID$.

Interface Brother's EP22 to Spectrum

Q I have a Spectrum, Interface 1 and Microdrives, and my wife has just bought a Brother EP22 typewriter. I see this has an RS232 interface — will the Spectrum drive it?

Brian Bull,
Camberley, Surrey.

A You should be able to link both devices so long as they have RS232 interfaces. In the case of Interface 1 the interface is distinctly non-standard, so you need an RS232 cable from Sinclair, and generally you need to get the other end of the cable wired up in accordance with the pinout on your printer — check this by looking up the printer pinout and comparing it with the pinout on page 49 of the Interface 1 manual — but Brother interfaces tend to work fine with the Sinclair cable.

Then it's just a matter of your sorting out parity, baud rates etc.

Guidance for Spectravideo owners

Q Although a few games are available for my new Spectravideo 328, I am unable to obtain any relevant books. I also own an Oric 48K and the software is available, along with books such as the Oric Companion.

Are there any books available for the 328? I've spent a lot of time and money trying to find them, but none seem to be available in Australia.

B Sturman,
Perth, W Australia

A You might as well stop looking, because we know of only one Spectravideo book — *Spectravideo Computing* by Ian Sinclair, published by Granada. The book might be handy for a complete novice, but if you've already got on top of your Oric you'd be severely disappointed by it.

The problem with the Spectravideo is that, though it's a nice machine, it hasn't really taken off. The manual makes reference to an advanced programming guide, but we've never seen a copy. However, the 328 uses a fairly standard Microsoft Basic, so any general programming guide to Microsoft Basic will be helpful. The Spectravideo is similar to the MSX machines, though it's still unclear how similar — but it may be sufficiently so for you to be able to use some, if not all, the MSX literature coming out this autumn.

Many months ago now Spectravideo also promised an MSX adaptor — this hasn't seen the light of day, but as soon as there are enough MSX machines around to make it worthwhile it's possible it will be launched, solving some of your problems.

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More hints and tips from our readers to make programming a little easier.

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A character sketch for the Amstrad

Amstrad owners may be interested to know that if 'SYMBOL AFTER 32' is entered (to redefine the character set), the whole ASCII character set is downloaded from ROM into RAM, starting at &A500 (42240).

As there are 224 characters on the Amstrad, each consisting of eight numbers, (0-255), these will reside from &A500 (42240) to &ABFF (44031).

Characters to the screen are now generated from RAM and not from ROM. These can now be easily manipulated by using either the Basic keywords SYMBOL — to redefine a character — or POKE, to poke numbers directly to the memory locations.

To find the start address of an ASCII character use the following:

location = 42240 + (N − 32)*8

where N is the ASCII number of the character.

If whole new character sets are created it will be quicker to save the memory locations &A500 to &ABFF as a binary file, rather than saving the program which created the new characters. To save the new character set to tape enter:

SAVE "CHARACTERS",B,42240, 1792.

To load in the character set first enter 'SYMBOL AFTER 32' to set the character generator to point to RAM, then enter — LOAD"CHARACTERS".

The new character set is then loaded into memory. Characters already on the screen are not affected, but any new characters printed to the screen take on the values of the new character set.

David Ellis, Bridgnorth, Shropshire.

Atmos character definitions in ROM

Atmos owners might be interested to know of an omission in appendix 9 of the manual. Memory location #020C contains the value: #FF for CAPS on, and #7F for lowercase type.

A ROM call not mentioned in the manual enables the character definitions stored in the ROM to be downloaded into RAM. The call address for this 'redefiner' routine is #F8D0.

M R Chambers, Bury, Lancs.

Copy whole Spectrum screen to a ZX printer

The following six-byte relocatable Spectrum machine code routine copies the full 24 lines of the screen to the ZX printer when called. The third number in the data statement (192) represents the number of pixel lines to be copied, and can be any number between 1 and 192. For example, if it is changed to 96, only the top half of the screen would be dumped.

Two useful calls for the machine code programmer are to the locations 3652 (OE44 hex), which clears the bottom 'register B' lines of the screen, and CALL 3503 (ODAF hex), the equivalent of CLS in Basic.

Callum Gibson, Blairgowrie, Perthshire.

```
10 CLEAR 32449
15 GOSUB 45
20 FOR f=32450 TO 32455:READ a:POKE f,a:NEXT f
30 DATA 243,6,192,195,175,14
40 RANDOMIZE USR 32450
44 REM Routine for demonstration
45 FOR T=0 TO 255 STEP 5
50 PLOT 0,0
60 DRAW T,175
70 NEXT T
80 RETURN
```

Action replay for Atmos games

This routine, for the Atmos, clears the screen so you can type or draw the sequence you want. When you have finished, pressing shift and 2 at the same time reproduces the picture a square at a time, finishing with a ping.

Typing/ends the program, and the space bar will repeat the process.

T Warburton, Lancaster, Lancs.

```
0 CLS: POKE #26A,10: GRAB: HIMEM #700
1 B=#700: PRINT CHR$(17)
10 GET A$ : IF A$="@" THEN 70
16 IF B=#B300 THEN 70
20 A=ASC(A$) : POKE B,A : B=B+1
30 PRINT A$;: GOTO 10
70 CLS : FOR C=#700 TO B-1
90 D=PEEK(C) : WAIT 5
100 PRINT CHR$(D) ;: NEXT : PING : GET A$: IF A$="/"
    THEN END
110 GOTO 70
```

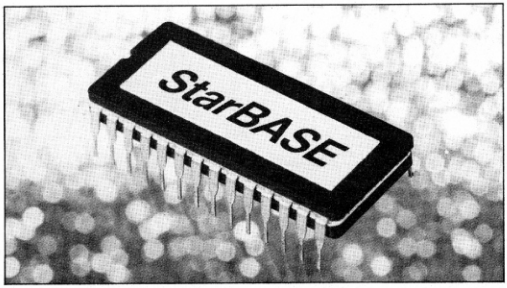
Turn a laser beam on your Spectrum

This program can be used to great effect in Spectrum programs. It simulates a laser beam etching an image on the screen. The source of the laser can be altered by changing the values of view and point. Changing the value of Z in line 40 to 0 leaves a 3D image stretching into the horizon.

Andy Goodsell, Kenley, Surrey.

```
 10 REM LASER-WRITER (C) ANDY GOODSELL
 20 REM MAIN ROUTINE
 30 PAPER 7: INK 0: BRIGHT 0: BORDER 7: CLS
 40 LET view = 100: LET point = 40: LET z =
    1: REM LET z = 0 FOR 3-D EFFECT
 50 FOR i = 1 TO 28
 60 READ a,b,c,d
 70 PLOT a,b : PLOT view, point: DRAW OVER
    z; a-view,b-point: PLOT view, point:
    DRAW OVER z; a-view,b-point
 80 PLOT c,d : PLOT view, point: DRAW OVER
    z; c-view,d-point: PLOT view, point:
    DRAW OVER z; c-view,d-point
 90 PLOT a,b: DRAW c-a,d-b
100 NEXT i
110 PLOT OVER 1; view,point
120 REM END OF MAIN ROUTINE
130 REM DATA FOR "PCN" FOLLOWS>>>
140 DATA 7,127,7,31
150 DATA 7,31,23,31
160 DATA 23,31,23,63
170 DATA 23,63,63,63
180 DATA 63,63,63,127
190 DATA 63,127,7,127
200 DATA 23,111,47,111
210 DATA 47,111,47,79
220 DATA 47,79,23,79
230 DATA 23,79,23,111
240 DATA 87,31,87,127
250 DATA 87,127,143,127
260 DATA 143,127,143,111
270 DATA 143,111,103,111
280 DATA 103,111,103,47
290 DATA 103,47,143,47
300 DATA 143,47,143,31
310 DATA 143,31,87,31
320 DATA 169,31,169,127
330 DATA 169,127,191,127
340 DATA 191,127,215,71
350 DATA 215,71,215,127
360 DATA 215,127,231,127
370 DATA 231,127,231,31
380 DATA 231,31,207,31
390 DATA 207,31,183,87
400 DATA 183,87,183,31
410 DATA 183,31,169,31
420 REM END OF DATA
```

StarBASE... a new database



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Calc. — Set into the form, your data fields, "# # # # #" and specific file-related activities, formulae and validation checks. Enter values and see the spreadsheet calculate itself.

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Here's an example of an invoice you might design for your stationery .... You could design you own spreadsheet, order form, statement, wage docket, or any other kind of form that is required to fit your existing stationery.

```
                                  INVOICE                    <0> ##########
 To  #<1>##########                          From: G. W. Ltd
     #<2>##################                   55 Bedford Court Mans.
     #<3>##################                   Bedford Avenue
     #<4>##########                         London W.C.1.
     #<5>#######                            Tel: 01-636-8210

 Date<6>##.##        Tax point<7>##.##        Agent<8>###

 Quantity  Description                        Cost    Tax     Total

 <9>### <10>################  <11>##   <12>##   <13>###.##
 <14>## <15>################  <16>##   <17>##   <18>###.##
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
and so on
                 Total....<19>######          Tax....<20>####
```

<??> items <1> to <5> internal command to request name, input, and then search an address file for details.
<??> items <6> to <7> request date input and validate.
<??> item <8> request agent number and validate range.
<??> item <9> request quantity, validate range.
<??> item <10> request description, search file, accept, and calculate fields <11> <12> <13>. If finished invoice then calculate fields <19> and <20>

Now comes the more valuable facility. You can provide the 'FORM' with file-related instructions, not only to request a 'console' input for file search against names, and stock, but after the invoice is finished, the fields you have selected may be passed to related files.

EG: Send fields <0>, <1>, <06>, <07>, <11>, <12>, <13>, <19>, <20>, to a sales ledger.
Then send fields <9> , <10> , <11> to product analysis file.
Then send fields <0>, <1>, <7>, <19>, <20> to V.A.T. file.
Then send fields <10> , <11>, <12>, <13> to Nominal ledger. Do you see?

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240 fields using cross-referencing
cross-record calculations.
'Jump-to' any record in 12 files.
User-define files/field words/sizes.
32000 records per filename
20 main/200 sub fields per record. field and record related formulae.
'Jump-to' any of 3200 records per file.
random/binary/key/multiple field search. 'if-then' questioning.
file protection/password entry.
range match, not match. integer match. sort speed 500 records per 20 seconds
endless 'either-or' matching
formulate/recall on selection criteria.
13 interrogation question types.
short filing output/audit trails.
"sale-mail-shots"; "production-process-purchase/sales-analysis"; "personnel-file"

DBMS III 7 new switch mode facility enables you to cross up to 12 different files (32000 records per file) pre-selecting any of up to 20 fields per record/file for display/print output (240 fields) in all. One massive enquiry can pass through 384,000 records

You might have two files whose records are directly related to each other, so that the first file (say containing names and addresses) refers to the second file (say financial and other information relating to the same record numbers in the first file) directly. Then you can simply choose that in file 1 you are interested in just the name and telephone numbers, whereas in file two, you are interested in the income, trading period and number of branches, information. Your enquiry can then pass through both files highlighting that information only. Actually there doesn't need to be a strict correlation between the same record numbers in different files. and you can also just on JUMP command go to any record in any of the 32000 records in any one of the twelve files and carry on cross-referencing from there onwards

DBMS'S MACROS WORK FROM THE MOMENT YOU INSERT THE 'TASK DISK' IN THE COMPUTER

Simply design your file, give its fields your words, set up your report mask, and then enter your records. Switch to 'automatic drive' and formulate any task you wish the program to fulfil, the task is stored as a macro. Take a copy of the program on another 'task disk' and from then on, the task disc will function without a single key-stroke. Think of a number of such 'task disks' such as "stock-re-order reports"; "stock-valuation reports"; analysis. "patient history analysis"; "research-analysis"; "budgeting"; "plus more?"

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[?]	Program	Application	[?]	Program	Application
[A]	DB	General database	[N]	SYS	System utility menu
[B]	DB	Names/addresses	[O]	BASCOM	Basic compiler
[C]	DB	Stock records	[P]	RBBS	! Remote bulletin
[D]	KEY	Ledger records	[Q]	DIAG	Diagnostics
[E]	KEY	Invoicing	[R]	SPOOL	Print spooler
[F]	KEY	Circular letters	[S]	QD	Ramdrive
[G]	CRT	Create forms/text	[T]	LEARN	Learn PC-dos 2
[H]	SC3	spreadsheet	[U]	OVER	Overview of system
[I]	WS	Word-processing	[V]	VOC	! Voice synthesis
[J]	TLK	Tele'communication	[W]	TELEX	! Telex system
[K]	XENO	Read Nonhost disks	[X]	MNGMT	# Management account
[L]	BASIC	Interpreter	[Y]	PAY	# Payroll
[M]	GAMES	Selections	[Z]	***	Other specification

>>>> [?] <<<<

The menu system is subject to change. Please note that items marked "#" are NOT supported directly by us NOR included in the price. Items marked "!" ARE available through us but involve extra hardware. The main menu display can be changed by you to suit particular needs, you only edit the PROGRAM name and APPLICATION to match that of the file on your system.
The system menu functions in tree structured ms-dos sub-directories so that each application is self contained on one hard disk in the computer
Minimum hardware specification (Any PC compatible computer with 320k ram and 1/2 floppy disks plus one internal 10 megabyte hard disk and any suitable printer of your choice. It is possible to acquire a system that runs the entire suite of packages on an IBM (tm) for under 6000.00.
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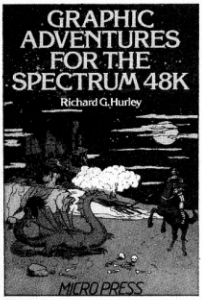


'Graphic Adventures for the Spectrum 48K' by Richard Hurley, published by Micro Press at £5.95 (paperback, 194 pages).

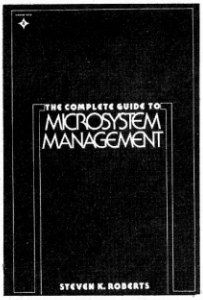
Richard Hurley is a dangerous man. His previous book, *Making the Most of your Spectrum Microdrives*, showed a tendency to present the reader with monstrously long listings, but his latest work shows that was merely a curtain-raiser.

Graphic Adventures for the 48K Spectrum is mainly listing, and if you divide 194 pages by seven (the number of adventures included) you'll get an idea of the complexity of the adventures. In the first of the batch, Mr Hurley even resorts to space-saving techniques, proudly boasting that he's saved 6K of memory.

The flip side of this is that he uses expressions like VAL "1" instead of 1, which may not sound too bad to you until you meet the three pages of DATA statements that all use VAL "32" *etc*. If you can face hacking it in, you should wind up with a pretty complex adventure.

There's not a lot of overtly educational stuff in the book, and the techniques used generally aren't frontiers of Basic material, but there are a few useful tips, such as how to design a full alternative character set and how to save space by using pseudo arrays stored above RAMtop. Personally I'd tend to the view that a few more radical programming techniques, such as storing and amending whole screens for graphics, might have been more welcome than endless PLOT and DRAW and DATA statements.

Still, if it's cheap and cheerful adventures you want, and you don't mind wearing your fingers down to the elbow, you won't find much better value. **JL**



The Complete Guide to Microsystem Management by Steven K Roberts, at £15.25, published by Prentice Hall (paperback 184 pages).

Wading through this book is like being trapped next to a talkative American business executive on a transatlantic flight. There's possibly a lot of useful information to be gained, but you have to struggle with the way it's presented.

A major problem is the book's confusing idea of the reader. It's intended to guide first-time buyers through the many trials and tribulations of choosing, buying and using their new micro system. Yet it also assumes familiarity with computer jargon and technical terms, and doesn't provide a separate glossary.

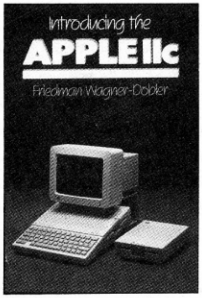
Novices who don't know a dongle from a kludge are, instead, recommended to become familiar with computers on their own — by visiting computer shops, reading relevant magazines, taking a programming course at night, and even buying themselves a home computer. That may be sound advice, but not too consoling to perplexed prospective buyers, especially if they are the busy business people the book aims at.

No guidance is given, either, on the merits (or otherwise) of specific equipment or on applications of interest to business buyers. The author defends these omissions, pointing out that there are far too many applications to do justice to them all, and that machine recommendations quickly become obsolete in such a fast-moving technololgy. Again, while he is probably right, it might have been helpful to offer novices at least some insight into typical uses along with the kind of hardware and software such applications require.

As it is, the reader's first choice is to plough through all manner of chatty advice about User-Vendor Relations (translated: how to go about buying your micro system) and the System Environment (how to save it from various kinds of disaster once installed).

These chapters account for over half the book. Patient readers who get this far are rewarded in the next two chapters, which actually get down to explaining what hardware and software are, how they work, etc, in language that only claims to be jargon-free.

If you have a high level of tolerance for Americana and good orienteering skills, you stand to gain some useful tips from this book. But calling it a complete guide is a bit much, as is its price. **HH**



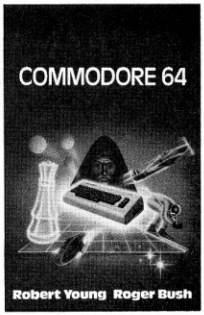
'Introducing the Apple IIc' by Friedman Wagner-Dobler, published by Pitman at £6.95 (paperback, 116 pages).

Now that the Apple IIc has finally hit the market, a flood of books is beginning to appear.

Beginning with a chapter explaining what computers are, and what they can do, the book then covers the various types and availabilities of software, including prices. The author then covers what you get for your money, with quite a good section on the keyboard, disk, interfaces, documentation and supplied software. A discussion of printers, joysticks, touchpads and mice follows.

An unusual feature of this 116-page book is its comprehensive 3½-page index. Even if a subject only merits one sentence, it gets a mention.

Considering its size, the book does have an awful lot in it and is probably worth reading before buying a IIc. **KG**



'Games Commodore 64 Computers Play' by Robert Young and Roger Bush, published by Addison Wesley at £6.95 (paperback, 180 pages)

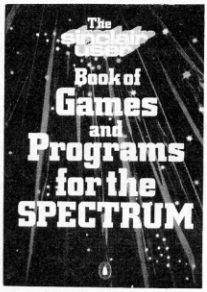
This book of programs offers quality instead of mere quantity. Nineteen are provided — rather than the more common 50 or 100 — and these cover arcade games (ten), adventures (four) and board games (five).

The programs have been well written, by a variety of programmers, and are as good as much of the commercial software available. The 64's special graphics facilities have been well and often originally used, and each program is very cheap at under 40p apiece.

One nice feature of the book is that two of the board games are ones that are not easily played in real life — 3-D noughts and crosses and Othello, or Reversi. The implementation of Othello is particularly good, and the computer's strategy has been well thought out: it's hard to beat.

The arcade games are also stimulating, although ideas like Skiing are rather hackneyed now. Other games, however, like Descent Into Chaos, are both addictive and enjoyable, and as the games are provided with both joystick and keyboard routines, they have a wide appeal.

The book is let down only by the rather unimaginative adventures, which betray the author's wargaming background. **PL**



◀ 15

'The Sinclair User Book of Games and Programs for the Spectrum' published by Penguin Books at £3.95 (paperback, 181 pages).

What better way to start programming than typing in a few games?

Sixty games and programs from *Sinclair User* are included in the book. All listings are very clear and no problems should be encountered entering them into your Spectrum.

There is even a section explaining how to enter programs and the conventions used for graphic and inverse characters.

Programs included in the book range from Jannis the Menace, in which you have to knock as many cans as possible off a wall before your granny catches you with her slipper, to Personal Finance, which helps you keep track of your financial situation.

If you want arcade standard games you will be disappointed with this book — go down to the computer shop and buy a game for a fiver. On the other hand, sixty programs for £3.95 can't be all that bad and you may even learn something about proggramming. **SC**

'Commodore 64 Disk Systems and Printers' by Ian Sinclair, published by Granada at £5.95 (paperback, 115 pages).

The vast majority of Commodore 64 owners will be satisfied with just a 64 and a cassette unit for a while. But when they want to move onto more complicated applications like word processing or serious programming, they must add to this system. Their next two purchases (after the inevitable joystick) are likely to be a disk drive and a printer.

At first sight there doesn't seem to be a whole book's worth of information in these two peripherals, and this is borne out by its brevity — there are only 95 pages of main text.

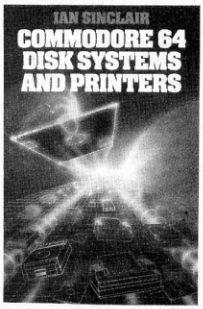
However, what there is describes the use of the Commodore 1541 disk system in detail, and this takes up the bulk of the book. Following this is a 20-page guide to printers, which devotes most of its attention to the non-Commodore variety. This is quite sensible since the independent printers tend to be more versatile than Commodore's own, even if they can't print the graphics characters. This chapter is one of the best in the book, and lucidly describes the use of Escape codes as well as the principal types of printer available.

The chapters on disk drives include descriptions of the Disk Filing System, general filing systems, and discussions of disks etc, but seem to be a little padded out. There should really be room in a whole book to cover more than two peripheral types, which could be dealt with succinctly in about 50 pages.

What justifies this book more than any other feature is the database example, which not only provides the required program, but explains it in depth and gives an indication as to how databases in general can be constructed — an interesting and informative 15 pages.

Half a dozen appendices provide useful information on where to get the products mentioned, as well as general information on random access files and saving machine code as a serial file.

Ultimately, however, the book is too short, and at £6 a bit expensive for the relatively small amount of information provided. **PL**



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The above software is being used by many large and small industrial and commercial organisations — List Available

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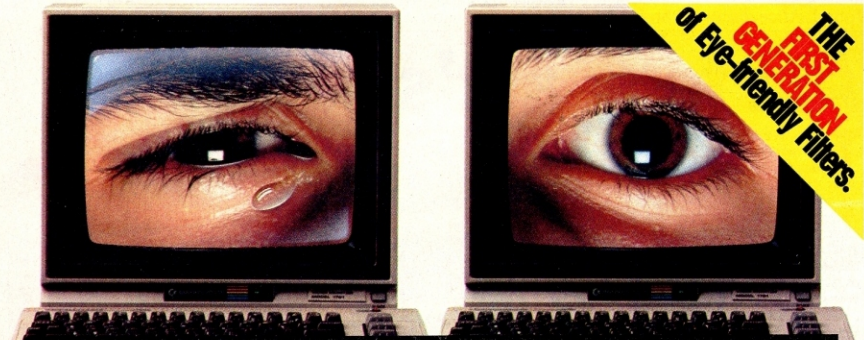

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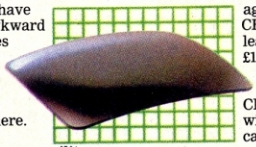

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John Lettice discovers how software houses are catering for Spectrum users with artistic inclinations.

Art four art's sake

There was a time when I'd look at the title screen of the latest Spectrum game and naively wonder how it was done.

Certainly, if you sat down and concentrated hard you could see how it could be done, even taking the Spectrum's graphics limitations into account. But what baffled me was why someone, even for lots of money, would go to the brain-bending bother of working it all out.

But now the secret's out. In as much as the shelves of computer stores ever bulge, they're currently bulging with Spectrum graphics packages. So much so that you need never again curse your re-INKed characters, or tell yourself 'I must do something about improving that fill routine'.

Graphics packages usually cover two main areas: they'll produce full screen graphics without a lot of the hassle this would otherwise involve, and they'll also generally provide some form of user defined graphics (UDG) facility. The latter is certainly useful as an adjunct to the software's artistic side, although if it's a full sprite system you want you'll almost certainly have to look elsewhere.

You shouldn't put too much emphasis on having a UDG facility within the program unless it has fairly advanced features. The Spectrum, after all, comes with a UDG design program on the Horizons tape, and it's always struck me as peculiar that people will sit down and write their own (often worse) program rather than use this.

In the case of *Melbourne Draw* the extra is the fact that it allows you to save any one of the character positions on the screen you've designed as a UDG. While a routine of this sort is fairly easy to write, simply involving reading the character position and POKEing its details into the correct character, it's useful to have it integrated with a program that will draw that screen. And it's not that easy to knock off something of the calibre of Melbourne Draw.

Melbourne Draw

From the packaging of Melbourne Draw it looks like *The Hobbit* has gone to Melbourne House's head. 'In fact with Melbourne Draw the graphics potential of your Spectrum becomes unlimited,' it trumpets modestly.

It's probably advisable not to take this claim too literally, because although the package is good, if you reckon it'll do something like batik or silk vinyl finish you'll be sorely disappointed.

Once it's loaded the program presents you with the standard Spectrum screen of 32×22 character positions. The bottom two lines give you information about the current status of the program, giving you the mode you're in, whether you're editing the screen or the attributes, and the current coordinates of the cursor you use to draw on the screen.

The numbering for the latter corresponds with the Spectrum's own PLOT and DRAW coordinate system, with the addition of minus Y coordinates to allow you to draw in the bottom two lines of the screen. These aren't normally available from Basic, but it's possible to POKE attributes into that area of screen memory, and to use them as part of the main screen. Melbourne's way of dealing with the ensuing coordinate problem is certainly a fudge, but bearing in mind that you'll be a lot happier using the coordinates you know, it's an acceptable fudge. You will of course have to shift the report lines in order to use the area for graphics, but this is fairly plain sailing.

Drawing itself simply involves using an ersatz eight-direction cursor cluster centred around the S key on the Spectrum. This moves a small flashing dot around the screen.

The keys have a fairly gentle auto-repeat timing of around one second, so you won't find yourself zapping around too fast unless you want to. The cursor moves without leaving a mark while it's in skip mode, while set mode switches pixels on, and reset switches them off. Invert reverses any image the cursor moves over.

Now close your eyes for a moment (finish reading this paragraph first) and imagine a graphics system that allows you

to manipulate individual pixels on the Spectrum's screen. If you stare hard at the screen, apart from getting a splitting headache, you'll realise the difficulty involved in actually seeing what you're doing.

Never fear, you can magnify the screen by four or by 16, and while you're doing this the magnification indicator in the report window shows you which area of the screen you're on at any given time. You can therefore work on your drawing in detail quite easily, although I'd suggest you rough it up on the full screen first, before tackling the detail.

The next obvious problem you'll face with the Spectrum is that of setting colour. You can PLOT and DRAW on individual pixels, but you can only set one INK and one PAPER colour for each individual 8×8 character position.

Eye-closing time again — think of a beautifully detailed drawing, the sort of thing that Albrecht Dürer would be proud to show his mother. Now think of our hapless engraver rashly deciding to use a PAINT command he's just run up on his Spectrum. 'Aaargh!' he cries. He throws away his Spectrum and decides to open a wurst stall.

Melbourne deals with this by including a FILL routine, then using a single character position sized cursor that allows you to set INK and PAPER one position at a time. Once you do this you'll probably still have to make amendments, but it should be obvious what they are.

And there's an even easier way to deal with the problem. You can overlay a grid onto the screen, and with this in place you can't really go wrong.

The grid also comes into its own when you're dealing with UDGs. There are only the standard 21 available, but the program has the advantage of tying UDGs into PLOT and DRAW.

When you're just using the Spectrum's standard graphics facilities it's actually difficult to relate the two. User defined graphics are easy to move around the screen, but it's not that easy to link more than two or three of them together without a lot of planning first. Similarly, although it's fairly easy to use PLOT and DRAW for larger illustrations, it's more difficult to move them around the screen, and if you're using UDGs as building blocks for pictures you don't really have enough to be able to muck one or two of them up.

Because of this it really is very handy to be able to virtually page UDGs in and out of memory, copying them to different locations and so on. I have a dream that you could write a program that stored whole screens in the form of individual UDGs, then used some sort of scrabble technique to rearrange the screens into other screens. Umm . . . I'll write it tomorrow . . .

There's also a facility for saving the UDGs as an area of memory, and thus cutting down the amount of space your programs take up, but as this is in the Spectrum manual it's only reasonable that Melbourne should allow you to do this.

Overall, it's an excellent package, and I've very few, and very minor, complaints about it. It allows you to scale the picture down by 7/8ths, or up by 1/7th, but doesn't allow you to reverse this feature. It would have been even better if you could, but equally it's nice to have the feature in the first place.

The Screen Machine

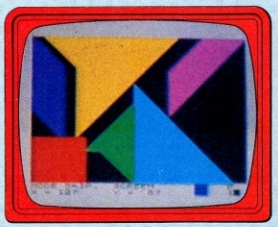
Screen Machine is allegedly 'the ultimate screen editor'. You can be forgiven for thinking you're in the wrong article at this point, because while we are talking about editing screens here, a graphics design package isn't exactly what the rest of the world generally means by the term. And it's not by Ultimate either.

It's less detailed than Melbourne Draw, and will therefore be easier to use. ISP has decided against using cursor-controlled line drawing at all, using instead 19 pre-packaged functions, along with 95 graphics characters (these are in addition to any UDGs you want to use) as building blocks.

But having learned this, have a look at page four of the manual: 'Please note: The graphics character set provided with Screen Machine is copyright ISP Marketing Ltd.'

If this means ISP wants a piece of the action from any commercial program that uses these characters I reckon the company's pushing its luck — like millions of others, I've programmed some of these graphics myself in the past, and I don't

20 ▶



really see how ISP can copyright hearts, diamonds, clubs and spades symbols.

Besides this, the graphics set is really pretty feeble (like I say, I've programmed some of them myself). Still, I'm looking forward to ISP sueing Commodore or one of the other block graphics merchants for breach of copyright.

At least there's none of that messing around with cursor-controlled line drawing, is there? Not exactly—say you want to draw a line, you'll find it's automatically drawn from the last pixel plotted or the end of the last line or circle drawn. The syntax D+5, −5 is used to draw a straight line, and this particular example is analogous to the Spectrum command DRAW 5, −5. This latter, incidentally, takes one less key depression. Good, eh?

PLOT is similarly verbose, using a(x,y) as the equivalent of PLOT x,y.

Fortunately, a few improvements have been made to the Basic commands. PLOT and DRAW commands that would take the Spectrum off its screen will simply be ignored, and circles can be drawn off the screen. But for these marginal improvements the program wouldn't really be worth it. There is, however, a method of creating a margin display, and you can rotate characters (only one character position at a time) in groups of 90 degrees.

You can also enlarge. 'A common desire amongst users is to display characters at eight times their normal size.' It's therefore fortunate that 'the Screen Machine Enlargement command will enlarge the contents of any character cell by eight times'. Personally I always thought users were keen on enlarging characters by nine times, but clearly I stand corrected. Again, though, it's just done on a single character basis.

Really, the whole package seems to me to be far too limited to make it worth using. The initial idea of making it easier than other graphics packages may have been a good one, but the commands used are by no means obvious.

Paintbox

The initial claim to fame as far as *Paintbox* is concerned is the fact that it gives you 84 UDGs using banks of data which are switched in and out of the UDG area as and when you need them. This gives you a much more powerful 'building block' facility than either Melbourne Draw or Screen Machine, and these banks can also be used from within Basic programs.

The drawing facilities are less comprehensive than those in Melbourne Draw, but it's really a case of swings and roundabouts. If you're using more UDGs then you might find it easier than operating on a pixel by pixel basis. Paintbox also errs more on the side of pre-packaged routines like circles and arcs.

In order to combine these facilities you use something called Screen Planner, which allows you to use the UDGs. By switching between this and the drawing mode you can build up quite complex pictures. There is also a facility for saving up to five screens to tape, then loading them back into memory. By paging these in and out you could produce a form of animation.

Dynamic Graphics

The salient difference between *Dynamic Graphics* and the other packages dealt with here is that it allows you to produce sprites for combining with your own programs. The difference here is that you aren't just producing user defined graphics, but rather you're building animated sequences of characters that will shuffle across the screen in whatever way you want.

The end result is a machine code subroutine that you can save in memory and call up from Basic programs, so space intruders without tears could well be with us at last.

The second tape that comes in the Dynamic Graphics package is Drawmaster. This uses a cursor drawing method, again with eight possible directions. You can also draw arcs and circles, and fill and rescale your works of art. It will also define windows and revise the screen attributes. Drawmaster itself has its good points, but overall I feel that its main advantage is its sprite facility.

There are a number of other graphics packages out, and they do seem to be developing in the same sort of way as Dynamic Graphics. The newly-released *White Lightning* is probably the most notable, being first and foremost a games design package. It is Forth-based, and although geared to games, screen design becomes an adjunct to this. Certainly it takes some getting used to, but the rewards are high, and it looks very much like the next major success story. PCN

Dynamic Graphics—£14.95 from Procom Software, 01-508 1216
Paintbox—£7.50 from Print 'n' Plotter Products, 01-403 6644
Melbourne Draw—£8.95 from Melbourne House, 01-941 4540
Screen Machine—£8.95 from ISP, 15a Castons Yard, Basingstoke, Hants

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The mysteries of the Memotech's screen handling features are dispelled by Keith Hook's expert explanations.

Screen studies of an

The Memotech's screen handling can initially seem difficult to get to grips with—superficially it doesn't seem to have direct memory mapping of the screen, and the manual doesn't explain how you can write to and read from the screen using POKE and PEEK. The confusion is basically caused by the way the display operations are managed. The Memotech uses the Texas TM 9929A Video Display Processor (VDP) to handle all data relating to the screen, while other micros tend to use the cpu for this.

So, although the presence of the VDP is confusing, it is actually an advantage, giving you 16K of video RAM on top of the normal RAM, and giving you added flexibility once you get to grips with it.

Normally the screen is memory mapped in RAM. For instance, the Colour Genie is memory mapped at 4400Hex to 47FFHex for the low-resolution screen. Fast writes or reads from/to screen can be accomplished by PEEK (*address*) or POKE *address, value* (as shown in Diagrams 1 and 2).

At first sight it seems that writing to the screen using POKES or reading from the screen using PEEKS is not possible on the MTX — the instruction manual certainly doesn't mention the subject. However, memory mapping of the screen via VRAM is directly comparable with the system described above for the Colour Genie, except that it is managed by the VDP and not the Z80 cpu.

MTX Basic sets the start of the text screen (Diagram 3) at 1C00 Hex (7168 decimal) in VRAM. This address corresponds to the first position on the screen top, left-hand corner.

Writing data to VRAM involves sending the destination address to the VDP via port 2. Once the address has been set up data can be transferred to VRAM through port 1. But bear in mind the following:

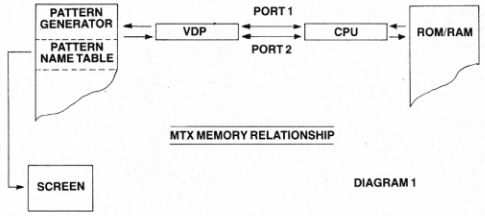
- The VDP contains an 'Auto Incrementing Logic', which means that once the address has been set up, sequential writes to the screen need only involve sending data, for example:

Write three blank spaces one after the other.

```
OUT (02), ADDRESS
OUT (01),32
OUT (01),32
OUT (01),32
```

- All addresses must be sent to the VDP LSB first, followed by MSB.
- The value of each address is contained in 14 bits. Bits 6 and 7 of the MSB inform the VDP which type of operation it has to perform, *eg* write to registers, write to VRAM, read from VRAM, read Status

DIAGRAM 1



MTX MEMORY RELATIONSHIP

DIAGRAM 1

DIAGRAM 2

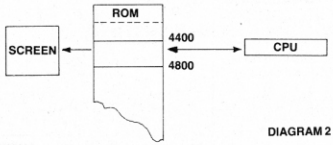
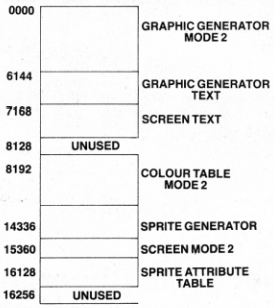


DIAGRAM 2

USUAL TYPE OF MEMORY MAPPED SCREEN

(COLOUR GENIE)

DIAGRAM 3



V RAM MEMORY LAYOUT UNDER MTX BASIC

MTX

Register. When writing to VRAM, bit 7 must be 0 and bit 6 must be 1. This is taken care of with line 130 in Listing 1. The subroutines to POKE and PEEK VRAM differ slightly in their make-up; when reading from VRAM both bits 7 and 6 must be zero.

POKEing and PEEKing VS 4 — the high-resolution screen — is a very complicated business. In fact, PEEKing in the normal sense of the word is almost impossible, as in the high-resolution mode no values are contained in the pattern generator, and each value is loaded into the pattern name table and then the relevant colour byte is set. We will therefore restrict our routines to the text screen.

Sprite collision

It is a surprising fact that the MTX does not contain any Basic command dedicated to the detection of sprite collisions.

Sprite collisions can be detected by examining the value of bit 5 in the Status (Read Only) Register. Whenever the '1' bits of two sprites coincide on the screen the VDP sets bit 5 in the Status Register to 1, otherwise bit 5 is zero.

Status Register	Bit: 7	6	5	4	3 2 1 0
	F	5s	C	—	5th sprite no.

However, there is one drawback to this method of checking sprite collisions: the VDP will detect collisions between sprites which are not on the visual plane, and will detect them between those that are not even active, if their X,Y coordinates coincide. To overcome this problem you have to place a value of 208 in the Y coordinate of the sprite number directly after the last sprite you wish to include. The VDP will then terminate its checking when this value is encountered. This procedure can be accomplished by ADJSPR 3, *sprite number*, 208.

Listing 2 gives details of the subroutine that will check bit 5 and return to the main program with the value of 0 = no collision, 1 = sprite collision. The Status Register is read by INP (02).

Joysticks

The left-hand joystick is mapped to the cursor control keys, and the functions of the joystick are identical to those of the cursor keys, *eg* cursor left = joystick left.

Detecting multiple key presses with the INKEYS function involves calling a subroutine at least twice. A better way to detect keyboard movement is to by-pass the INKEYS function and carry out a strobe of the computer's sense-lines.

On the MTX each key has a unique value that is output on port 5 — this is termed the sense-byte. If the key is then depressed, a value of 127 will be returned when port 5 is read.

You can test this for yourself with:

```
10 LET A = PEEK (64894); System LASTDR
20 PRINT A;
30 GOTO 10
```

The screen should fill up with the value of 127. If you press any key, say the Home key, the value of 223 will be printed on the screen — this is the value that is sent out via port 5 to test if the Home key has been depressed.

Listing 2 will return the following values:

223 Fire Button
247 Joy left
239 Joy right
251 Joy up
191 Joy down

Listing 3 is a subroutine that allows you to test for a multiple key press. As stated in the listing, you will have to build a routine around this that will allow you to take the appropriate action for either a single key press or a multiple key press. PCN

LISTING 1

```
;       SUBROUTINE TO SET UP VRAM ADDRESS
;       THIS IS ON THE ASSUMPTION THAT VARIABLE 'AD' ALWAYS = START ADD
;       VARIABLE 'LOC' = ACTUAL SCREEN ADDRESS
;
;
100 LET AD = 1024 * 7           ; AD = START OF TEXT SCREEN
110 LET AD = AD + LOC           ; AD = ACTUAL SCREEN LOCATION
120 LET LSB = AD-(INT(AD/256)*256)
130 LET MSB = AD/256 + 64       ; MAKE SURE BIT 7=0 & BIT 6=1
140 OUT (02),LSB
150 OUT (02),MSB
160 RETURN
;
;
;
; SUBROUTINE TO SEND DATA TO ADDRESS SET UP WITH ABOVE ROUTINE.
; VARIABLE 'DTA' = VALUE OF DATA TO WRITE TO SCREEN.
;
200 OUT (01),DTA
210 RETURN
;
;
;
; SUBROUTINE TO READ A VALUE FROM TEXT SCREEN.
; ON EXIT FROM ROUTINE VARIABLE 'VRD' = VALUE ON SCREEN.
;
300 LET AD = 1024 * 7 : LET AD = AD + LOC
310 LET LSB = AD-(INT(AD/256)*256)
320 LET MSB = AD/256
330 OUT (02),LSB : OUT (02),MSB
340 LET VRD = INP(01)
350 RETURN
```

LISTING 2

```
; SUBROUTINE TO READ VDP STATUS REGISTER FOR SPRITE COLLISION.
; VARIABLE 'COL' WILL BE = 1 IF COLLISION DETECTED ELSE = 0
;
;
400 LET SCOL = INP(02)
410 LET COL = MOD(INT(SCOL/32),2)
420 RETURN
```

LISTING 3

```
; SUBROUTINE TO READ SENSE LINES FOR MULTIPLE MOVEMENT OF JOYSTICK
; E.g. FIRE BUTTON AND MOVE LEFT
;
; AFTER CALLING THIS ROUTINE SOME PROGRAM WILL BE NEEDED TO TAKE
; THE APPROPRIATE ACTION....EG
; 20 GOSUB 500
; 30 ON SRD GOSUB  50,60,70,80,90,100  etc , etc
; VALUES RETURNED ARE:- 1     JOYSTICK LEFT
;                       2     JOYSTICK RIGHT
;                       3     JOYSTICK UP
;                       4     JOYSTICK DOWN
;                       5     FIRE BUTTON PRESSED
; FIRE BUTTON AND JOYSTICK LEFT RETURNS A VALUE OF 6 AND SO ON...
;
;
500 LET SRD = 0 : LET SB = 223: OUT (05),SB
510 LET RB = INP(05)
520 IF RB = 127 THEN SRD = 5
530 LET SB = 247 : OUT (05),SB
540 LET RB = INP(05)
550 IF RB = 127 THEN SRD = SRD + 1 : RETURN
560 LET SB = 239: OUT (05),SB
570 LET RB = INP(05)
580 IF RB = 127 THEN SRD = SRD + 2 : RETURN
590 LET SB = 251 : OUT (05),SB
600 LET RB = INP(05)
610 IF RB = 127 THEN SRD = SRD + 3 : RETURN
620 LET SB = 191 : OUT (05),SB
630 LET RB = INP(05)
640 IF RB = 127 THEN SRD = SRD + 4
650 RETURN
```

QL THE HARD FACTS

Dongle-free QLs are poised to arrive on the streets: the hardware, the software and the SuperBasic got a long cool look from *PCN*.

By Stuart Cooke

At long last the Sinclair QL computer is becoming available. Everyone who ordered the computer just after the launch should have received it. According to Sinclair things are going so well that you should be able to buy the QL in high street shops from next month. Since the QL first made an appearance there have been a few changes in both the software and the hardware. How good is this so-called finished version of Sir Clive's brainchild?

Due to a problem of fitting the ROMs inside the QL computer, early versions of the machine were sent out with some of the operating software in a 'dongle' which was fitted into the cartridge slot on the rear of the machine. Probably the first thing you'll notice about the new machine, once you get it out of its polystyrene box, is the total lack of any form of dongle. Yes, the ROM is now inside the machine.

In use

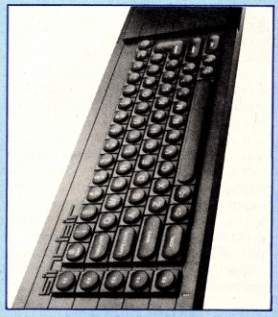
With the external power supply plugged in and the micro connected to your TV or monitor, you can start to use the QL.

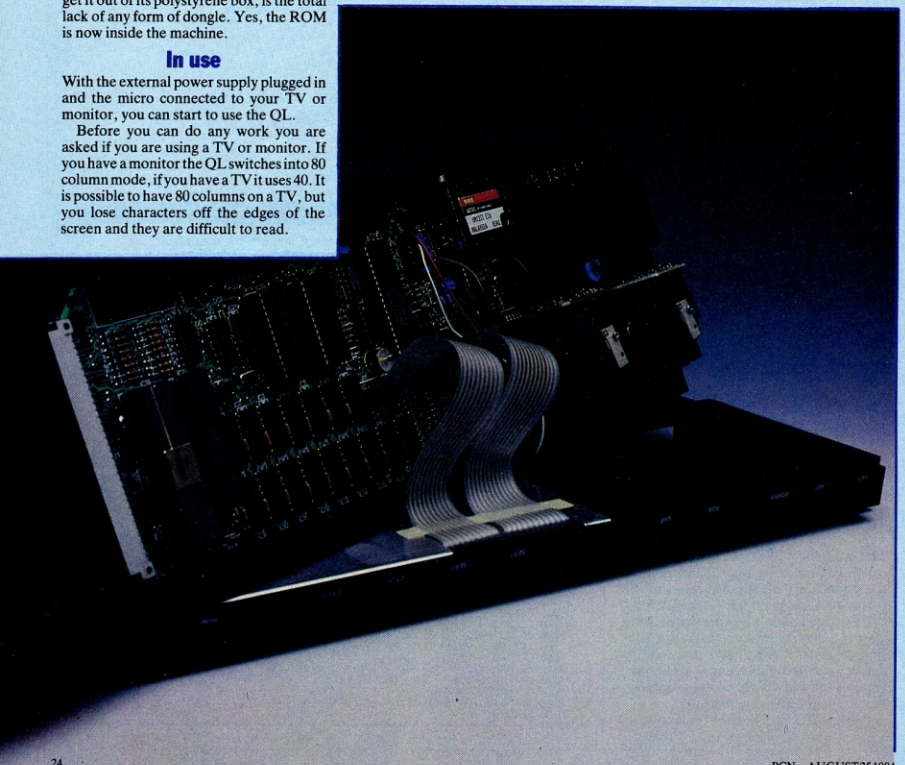
Before you can do any work you are asked if you are using a TV or monitor. If you have a monitor the QL switches into 80 column mode, if you have a TV it uses 40. It is possible to have 80 columns on a TV, but you lose characters off the edges of the screen and they are difficult to read.

The display is not the best by any means but it is adequate. With a TV the colours tend to be a little wavy. Even with a monitor that gives sharp pictures when used with other machines the picture may not be great.

Once you start to use the computer you find what is probably the most disappointing feature of the QL: the keyboard. Most computers today have a stepped keyboard and real keys. The keys on the QL are totally flat, rather like a calculator keyboard. When given to a touch typist to try out the reaction was definitely not favourable.

Because the keyboard is flat, Sinclair has included three feet that push into holes at the rear of the machine. This does tilt the keyboard towards you but doesn't step it.





Storage

Everyone interested in computers probably knows that Sinclair has provided two Microdrives rather than disk drives with the QL. Unfortunately these drives, and the small tape cartridges associated with them, are nowhere near 100 per cent reliable. If you have a Spectrum with an Interface 1 and Microdrives you can save your programs onto cassette for security. Unfortunately, the QL has no cassette interface and so you have to put all your faith in the Microdrives.

The main problem with the drives appears after the machine has been switched on for a while. The power socket is just behind the two drives and the QL gets very warm, especially towards the rear of drive two. When the QL failed to back up the software supplied with the machine, a spokesman for Psion said that this could be caused by the drives getting too hot. Turning the machine off and trying again later was his suggestion. If you had a long program in memory it seems rather silly to have to turn the machine off and let it cool down before you can save it. Fortunately, it appears that drive 1 can normally be trusted as it doesn't get as warm as number 2 — always verify any programs though as you can't be too careful.

Interfaces

The rear of the machine supports a vast array of sockets. These are the cartridge/ROM port, two joystick ports, two serial ports, TV, monitor, power and network connectors. The most important thing to notice about these sockets is that they are nothing like those found on other machines. If you happen to have a fairly new telephone examine the socket it plugs into. This could be the same type used on the QL for the joystick and serial ports.

If you want to make your own leads for the machine you're going to have problems. An hour spent going around the local hardware shops led me to believe that you simply can't buy them. The first company to produce an add-on that converts the serial sockets to standard 25-way D-type sockets and the joystick ports to 9-way could well be set to make a fortune.

Verdict

It's a real pity that the QL doesn't live up to what was expected of it. There are too many points which show a lack of thought — for example the type of socket on the rear.

In another six months, when there are lots of add-ons and the bugs in the machine are fixed, the QL will probably be a good buy. At the moment I think my money will go elsewhere.

SOFT SPOT FOR THE QL

By David Janda

Four application packages are supplied with the Sinclair QL computer. Psion, who until now has produced software mainly for the Spectrum and ZX 81, has produced the packages, called Quill, Archive, Abacus and Easel. The packages offer word processing, database, spreadsheet and charting facilities. According to Psion, each of these packages should be able to produce data which can be moved from one package to the other, creating a full business system.

There are a couple of points relating to the packages that I would like to dismiss. First, it was previously thought that the packages would be able to run in multi-tasking mode; this is not so. Second, the QL has a fair amount of RAM, but don't expect to use a lot of data — this is because the packages are very large.

Common features

The screen layout of each package is divided into three main areas. The top section is for the control area; the centre being used to display commands. Common prompts are shown at either side. This area is updated as different commands are used.

The main work area is used as the main display, and it may be split into more sections depending on what package is being used. The lower part of the display is used for the display area. Its purpose is to show information relating to options chosen, program status, user input etc.

Each package uses the function keys on the QL. F1 calls up the help file, which is organised in levels, and you return to the main display by pressing Return or the Escape key. F2 switches off the control area, thus giving more room for the work area, and F3 will toggle in the control area commands. Finally, pressing Escape will return you to the last command.

The user can select a 40, 64 or 80 screen width to suit the TV or monitor being used. Also printer configuration programs will allow fancy features such as underlining to be used.

Quill — word processor

The Quill's control area displays information on cursor movements as well as deletions and paragraphing. Information on what file is in use, page number, word count and others is shown in the display area.

Cursor movement is by letter, word or paragraph. Deleting text is achieved by letter, word or line. Both tabs and margins can be set as desired and will remain in effect until reset.

Different visible typefaces can be incorporated within the text, and provided the printer driver is used, these effects should appear on the final copy. Typefaces include superscript, subscript, bold, underline and 'paint'. Paint simply allows existing text to be changed to a particular typeface.

Headers and footers can be incorporated as well as pageing. Options allow line spacing to be changed as well as details relating to the format of the document.

The screen I/O on the QL is atrociously slow, and this is evident when using different features of the package. Things grind to a halt when the package is accessing the Microdrives, and Quill uses them a lot.

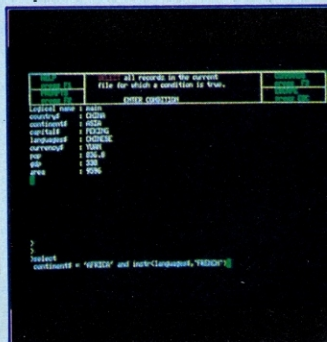
The latest copy of the Quill which I used had some oddities. It didn't allow more than one paragraph to be copied if there were spaces between them. Also, running out of memory sometimes resulted in the machine hanging up, or in some cases giving weird line numbers with minus values.

As far as features are concerned, the Quill offers a lot. However, it lacks in some respects, flexibility being one. The fact that existing Quill files cannot be merged is just one example.

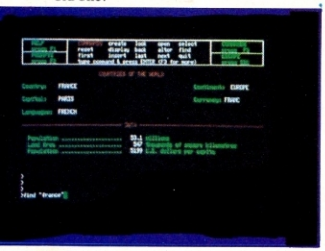
Archive — database

Archive's real power lies in the fact that it can be used as a simple index system, or as a complex data management system.

26▶



This is because it offers two modes of operation. It can be used in command mode, where the user enters commands that are directly executed on a data file. Using the Archive program editor, it's also possible to define whole procedure orientated programs that can do tasks from creating a new database to maintaining an old one.



There is no fixed limit on the number or fields there are in a record or the length of each field. Records can therefore be of varying length and can be added or deleted at will.

Two types of data are permitted: numeric and alphanumeric. Records can be sorted in ascending or descending order and multiple key fields are allowed. No immediate commands are provided to change the type or number of fields in a record, but under program control this operation would be very easy.

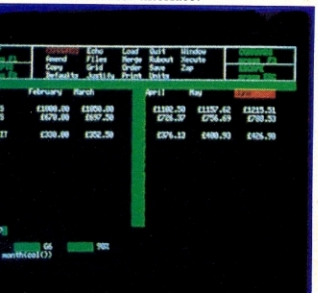
Data within a file can be interrogated in a number of ways. Jumps through a file can be made to the first or last record, or forwards and backwards by one record. FIND will perform a global search through all records and fields while SEARCH will do just that, but by using expressions such as IF NAME$= "David" . . .

Sub-files can be created by using the SELECT command which will 'group' together records that match a specified criterion.

With a package as flexible as Archive's, its many other capabilities can only be matched by the imagination of those who use it. I found that the only item to hold up the operation of the package was the Microdrives.

Abacus — Spreadsheet

Abacus incorporates all the normal features that you would expect from a spreadsheet. The difference between it and others is that it has very flexible text and labelling features as well as an excellent user-interface.



Up to 64 columns by 256 rows can be used to make up the spreadsheet. Moving about within it is achieved using the cursor keys, and the row/column position is always indicated. Larger movements use the GOTO command followed by the cell reference.

All calculations are performed to 16 digits, and as most don't require that many digits to be displayed, a host of formatting options are available. These will allow text and numbers to be displayed left, centre or right justified.

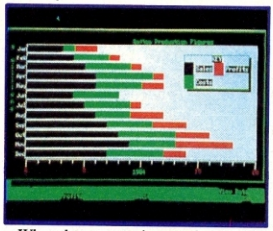
One of the main features of Abacus is that rows and columns of cells can be referenced by sensible names. That is, any text in a cell can be used as a label and can be used in calculations. The label can mean a reference to a whole column or row, and this method of identifying whole sections of the sheet is very easy to use.

As I have mentioned, the user interface is very good. Entering figures on a spreadsheet is not the most exciting thing to do, and any aid in error-free entry is welcome. Abacus provides the user with many (sensible) defaults, and on occasions I was surprised at how little I had to bash out commands or ranges.

Easel — business graphics

This is by far the easiest package to use. Sinclair claims that it is possible to produce a graph after seconds of using the package — and it is right.

This package will usually be used with imported data from Archive or Abacus, but it can also be used quite quickly manually.



When the program is run, a bar graph is selected as default with months displayed along one axis. The graph will be re-scaled depending on what values are entered, and if the entries go off the edge of the graph, it will be re-drawn on a smaller scale.

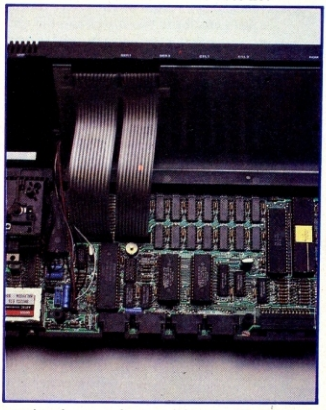
Different bar designs can be selected using different colours and thicknesses, and scales can be reset. Line graphs and pie charts are available as alternatives, and as with the bar charts there are plenty of ways in which they can be presented. For the final copy a photo of the screen can be taken, or the high-resolution screen dump to an Epson FX-80 can be used.

Using the package was great fun if nothing else. It was so simple to display bar graphs that I completely overlooked the more advanced editing features of the package. These allow you to create a new set of figures (and a new chart) from previous data.

Import/export

Each of the packages has its methods of saving and loading data. But this data can only be read by the package that it was saved with. Data can, however, be moved between packages, and this is referred to as importing and exporting. This is possible between Abacus, Archive and Easel, but not Quill which can only import data.

The compatibility between the different packages is achieved because the format of the data produced by the three is exactly the same. The only 'problem' in exporting data between the packages is that a few rules have to be followed. This does not restrict the user because the necessary information is well presented. I had no trouble at all.



Quill data cannot be exported because it is formatted text. Importing to the Quill is achieved by exporting data to a Microdrive ASCII file which is formatted, and thus can be handled by the Quill.

Verdict

For 'free' software, the QL packages are good. However, the 'you can't complain for the price' attitude doesn't apply. Many are going to buy the QL purely because four pieces of software are thrown in, and many are no doubt intending to use these packages in their businesses.

I would strongly suggest to anyone who intends to use the packages for 'serious' work to think again. There is nothing more precious than your data, so the software that you use and the system that you use it on has to be of very high quality.

In the packages I received, bugs (or oddities if you wish) need to be sorted out. Also note that the packages are quite large, and in the case of using the Quill, don't expect to write a chapter or two and hope to have memory spare — there won't be.

But by far the biggest setback are the Microdrives. As a form of mass storage they are a joke. Not so funny when data files can't be read back into one of the application packages, though. To summarise their performance — they are slow and unreliable.

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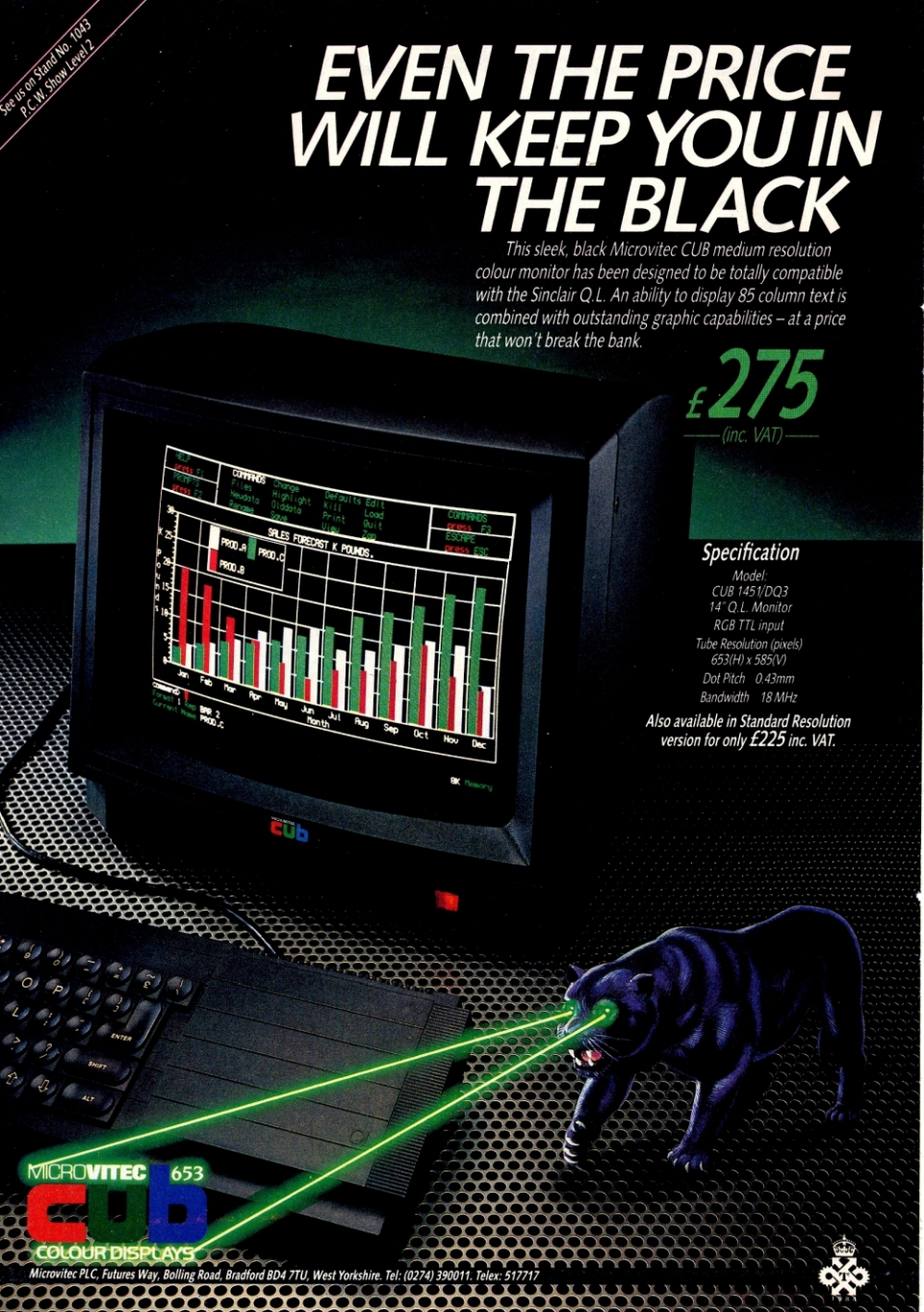

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HOW SUPER IS THE BASIC

By Kenn Garroch

The QL's SuperBasic lives up to its name in some ways, but in others it certainly does not.

First of all the pros. SuperBasic supports a wide range of useful commands that should make programming quite easy and efficient. It has a number of control structures which, though they are not really the standard implementations, do show willingness on Sinclair's part to upgrade Basic to a higher level than is normal.

Control

The control structures are unusual in that they use the command EXIT to get out of them, so instead of

```
LET T=0
REPEAT
LET T=T+1
UNTIL T=10
```

you need to use:

```
LET T=0
REPEAT loop
LET T=T+1
IF T=10 THEN EXIT loop
END REPeat
```

The FOR. . .NEXT is also rather unusual as it is possible to say, for instance:

```
FOR T=0 TO 10, 7 TO 4 STEP-1,1 TO 4
PRINT T;
NEXT T
```

and have the routine step T through all the appropriate values and print:

01234567891076541234

Note the QL does not insert leading or trailing spaces as do most other Basics.

Other unusual commands are such things as BAUD, for setting the baud rate of the serial port, full turtle graphics, PAN to scroll the screen horizontally, and SCROLL to do it vertically. It is possible to POKE bytes (8 bits), words (16 bits) and long words (32 bits), renumber a program with RENUM, and do automatic line numbering with AUTO. A SELECT structure is provided which is similar to ON GOTO and SCALE can be used to set the size of a drawing produced by a graphics procedure.

Multiple line procedures, and multiple line functions, with full parameter passing are available and easy to use. One nice thing about the procedures is that they can be defined somewhere at the top of the program and then used as direct commands, so instead of having to type DIR MDV1_ for a directory of drive one, the following procedure can be defined and a directory obtained by typing

```
DIR 1
DEF PROCedure DIR (d$)
DIR "MDV"&d$&"_"
END DEFine
```

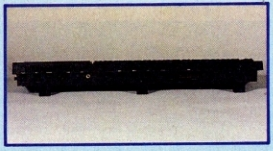
Strings

All the above commands should make SuperBasic something special, but unfortunately there are a few drawbacks.

FILL$("aaaaaa",32767) has a bug in it and is capable of producing very long strings and filling them with rubbish. Trying:

```
a$=FILL$("aaaaaa",32767)
PRINT LEN(a$)
```

causes the machine to print garbage.



When the QL is printing a long string, it is not possible to stop the beast with the usual CTRL SPACE. This applies to any of the commands, such as plotting long lines, and so on. By far the best way of hanging the QL up is to press the Control ALT and 7 all at once. No matter what the machine is doing, this will cause it to stop. Of course it is a little difficult to press all these keys at once, but the fact remains that it causes the machine to fall over backwards and go to sleep.

When using FOR. . .NEXT loops, including anything on the same line as the start of the loop, for example

```
FOR T=0 TO 10: PRINT "here"
PRINT T*T
NEXT t
```

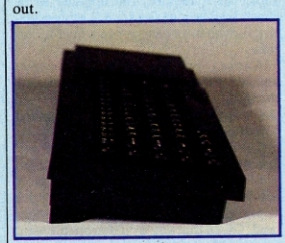
causes 'here' to be printed 11 times and the rest of the loop only once. This applies to placing anything after the colon, even REM.

Functions

Using a recursive function to evaluate factorials such as

```
DEF FUNction FACT (X)
IF X<1 THEN RETurn 1
RETurn x*FACT(X-1)
END DEFine
```

and then trying PRINT FACT (1000) will obviously cause an out of memory error, but takes a long time to do it. When it does run out of memory, all the variables are set to zero, making program debugging very difficult, since it is not possible to find out how far the function got before crunching out.



The manual states that RENUM cannot renumber RESTORE. This has now been fixed, as have all the other obvious bugs.

There are still problems with tokenising the Basic commands and if spaces are not put into the correct positions, *eg* GOTO10, the command will not work but GOTO 10 will.

The date functions are very good and cannot be fooled by trying to feed in bogus dates such as the 32nd of Feb, etc. The problem is that DATE$ cannot be sliced, *eg* PRINT DATE$ (1 TO 4) gives an error. To slice it, it is necessary to LET A$=DATE$:PRINT A$ (1 TO 4)

The beep command is very difficult to use and in fact the manual says that the best way to find out how it works is to experiment. This is not as easy as it sounds since the documentation is not specific enough as to what the parameters do.

A problem with the Microdrives from Basic is that if the drive is full and a program is saved, the system puts the file name into the directory. Deleting another file to make room and doing a directory makes it appear as if the program has been saved. In practice this file is empty and when loaded back in, the current program is NEWed, possibly causing a total loss.

The SELECT control structure does not work with strings, which is surprising since string equality produces the same result as a numeric equality, *ie* true is 1 and false is 0 (this is not very standard). If this had worked, it would have made SELECT equivalent to CASE, and since REPEAT and a proper FOR and IF structure are included, it seems a shame not to have done things properly.

Usability

Other problems with the Basic are generally caused by its inconsistency and possibly make it a little confusing to the beginner. In some cases, spaces are needed between commands and their arguments, but not in others; similarly, procedures are defined with the arguments in parentheses and then used without them. All this adds up to a fairly confusing system, even for the non-beginner.

It would also have been nice to have had a decent full screen editor, since EDIT line number allows access to only 160 (320 in mode 4) characters of the line at any one time. This may not seem too bad, except that it is possible to have program lines of almost any length.

Verdict

All these problems make the QL's SuperBasic difficult to use at times. A little more error trapping, especially on the string handling, would have been welcome.

If Sinclair can fix all the bugs and make the system a little more usable and improve the keyboard and correct the documentation and. . . and . . .

Well, it could be such a good machine with a very good Basic. PCN

The Tandy Model 100 gets a boost from this quick and easy to use interface, says Geof Wheelwright.

Taking Tandy up a Grade

Since the introduction of the lap portable, its main drawbacks have been lack of memory and the size of the screen display. Tandy, however, has come up with a solution that is available now for its Model 100. It's a disk/video interface that gives you both 40- and 80-column composite video/TV output as well as one 5¼in disk drive and room for an optional second drive.

First impressions

The interface is a big white box that comes packed in the obligatory styrofoam and cardboard casing. When you get the casing off, you'll find a manual, a disk with the Model 100 'operating system' on it and the disk/video unit itself.

Before you get going, you'll need to do two things; first, put an electrical plug on the disk/video interface, and second, make sure your Model 100 has the 'B' ROM chip fitted. This ROM is important in that it contains the necessary disk and video interface commands.

Tandy isn't charging anything for the 'B' ROM chips to upgrade existing Model 100s, but it requires the upgrade to be carried out by a dealer service representative — who must charge you a fiver for his time.

Anyway, once you've spent your fiver and put on the plug you're ready to hook up the interface. It attaches via a 40-pin lead that's about as sturdy as an old Apple II joystick connector.

The Apple II joystick connector was famous — or infamous — for its constant pin-bending activities, which inevitably resulted in yet another trip to the service department or the purchase of yet another lead. Given that you would probably want to be able to hook and unhook your disk/video interface quite freely, it doesn't make much sense to use a fragile 40-pin connector as the linking point.

It wouldn't have been hard to have a wedge-shaped adaptor (like the one on Sinclair's Spectrum Interface 1) that hooked on the back of the Model 100, giving it some much-needed height and a good typing tilt as well as providing a sturdy amphenol plug that could be plugged and unplugged without any problem.

Documentation

The interface comes with a single manual which is nice and chatty, in true Tandy/American style.

The manual consists of four sections. The first tells you how to set the system up and provides a number of pretty pictures. Part two describes all of the new commands available to run the disk system. The third section comprises an in depth analysis of the disk format, showing exactly how it is laid out.

The final section is basically a set of appendices detailing the technical aspects and containing tables of ASCII and error codes. Overall, the manual covers virtually everything you might need to know about the system.

If, by any chance, you need to know more, Tandy also has a service manual

available. This covers every technical detail you could possibly want — from taking the disk drive to pieces to the electronic circuitry and the signals it produces.

In use

The design of the disk/video interface is consistent with the Model 100: simple to use and limited in its power.

Once you've connected things up, just stick the operating system diskette in the top drive (there is only one drive on the basic interface, but an optional second drive — which fits below the first in the same box — is available) and switch on both your monitor and the interface.

Then you turn on the Model 100 and you're ready to go. The disk is immediately available to you for storage, but you have to give a command from Basic to use the monitor. The commands SCREEN 1,0 or SCREEN 1,1 (depending on whether or not you want the bottom line of the screen taken up by prompts) will transfer all subsequent information to the screen and will cause the monitor — rather than the LCD — to be the boot-up display from that point onwards.

It's worth pointing out that although everything in Basic, Text, Telecom, Schedule and Address appears on the monitor, the main 'menu' at power-up still appears on the LCD, turning it into a sort of microscreen from which programs and files are selected.

As you're not likely to be switching quickly between files too often, having the main menu on the LCD is not a great drawback.

Changing from the 40- to 80-column display is also pretty easy. It's a statement from Basic in the form: WIDTH 80 for 80 columns of WIDTH 40 for 40 columns. The 80-column display does add a good deal to the powerful word processor built into the Model 100. Text, the simple name given to the word processor on the Model 100, NEC PC-8201 and Olivetti M10, has the capacity for string-searching, variable width printing, block moves and deletes, automatic word wrap and full screen editing.

The disk drive is relatively quick — but so it should be, given the comparatively small amounts of data being shoved back and forth between the disk and the Model 100's limited 32K memory. The single-sided, double-density drive offers about 170K of formatted storage.

Verdict

Aside from my quibble with the connector my only other reservation about the device is the price. At £599 including VAT, the interface is a little on the pricey side. But then, Tandy has never been about low prices, instead making things easy to use and offering excellent service, back-up and dealer support for its products at a 'competitive price.

The great thing about the interface is that it's quick to hook up and very easy to use. So it's a trade-off between convenience and price. A less convenient way of doing the same thing at a lower price would be to get a BBC Micro with disk drive and write routines that send information to and from the Model 100 through the RS-232 port in order to make use of the Beeb's disk drive and screen. PCN

Additional commands available

LFILES	Displays the filenames on the disk.
SCREEN	Assigns the console to a specified device.
WIDTH	Sets the screen width.
DSKO$	Writes a string to the specified sector.
DSKI$	Gets a string from the specified sector.
LOC	Gets the current record number.

When the new Kyocera breed of LAPPIES (Largely Available Portable Processing In Every Sense) computers were first released in their respective Tandy Model 100, NEC PC-8201 and Olivetti M10 configurations, I was charmed by their size, power and ease of use.

I also hoped that these portables would grow up and be able — when necessary — to take more memory, use disks and run a cathode ray tube screen display.

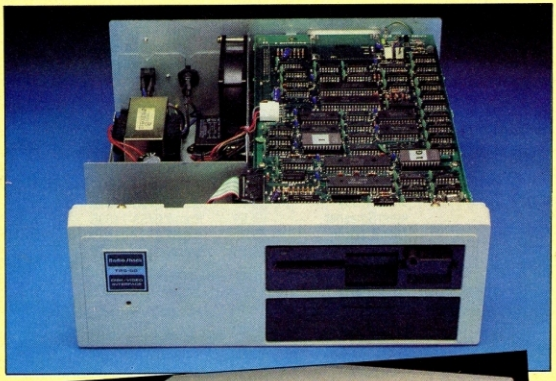
The NEC machine pretty much solved the memory question with its bank-switching system that allowed up to three banks of 32K to be accessed in turn. One of those memory banks comes in the form of an optional 32K memorty cartridge which can be plugged in the left-hand side of the machine.

A 32K memory cartridge, however, is not a disk — it doesn't act much like one (and at more than £150 a time, it certainly doesn't cost much like one) — and the Kyocera LCD screens are still only 40 columns wide by 8 lines.

NEC was rumoured to have a solution that involved a plug-in disk interface/ROM/80-column video outlet that not only gives you access to a full 80-column display from your portable, but also the use of a 5¼ in disk drive and the CP/M business operating system on a chip. That solution still has not appeared in this country.

Tandy, however, has come up with the goods, although the system still lacks a standard operating system. It is possible that some enterprising entrepreneur will come up with a CP/M system that will work with the Model 100 making a lot more software available.

Name Model 100 disk/video interface **Price** £599 **Supplier** Tandy high street computer stores.



SOFTWARE

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Note to software publishers: If you wish your company's product to be included, please send only the very latest releases to *Bryan Skinner, Software Editor, PCN, 62 Oxford Street, London W1A 2HG;* and please don't forget to include prices and a telephone number.

Games

Astro Chase (C64) isn't a new game but, like *Flip & Flop*, it's new to the UK. The company, State Soft, whose motto is 'Really Something Else', has signed licensing deals with American software houses and is poised to introduce a number of titles over the next few months. *Astro Chase* won the Science Fiction and Fantasy Game of the Year 1984 Award and, as with all State Soft programs, has the added recommendation of a fast-loading system. Curiously, the fast-loader is British-based, so we can still teach the Americans something about software.

Daley Thompson's Decathlon from Ocean means you can put off Olympic withdrawal symptoms for a little. It will also give you experience in destructive testing of joysticks. It's a bit like the arcade game *Track and Field*. You control Daley and you have to jiggle the stick from right to left and back to get his legs moving. While it's hardly riveting, the musical accompaniment is the best we've ever heard on the 64 and the game attracted plenty of attention.

US Gold is continuing to import software from the States, though with *Spooky Mansion* you might wonder why. It's a very simple game in which you, as a ghost, wander round various locations. A bit like Bug-Byte's *Rapscallion*, but without the interest or speed. US Gold has also imported Cosmi's new version of *Caverns of Khafka* for the Commodore 64. This is certainly worth a look.

Frank N Stein is the latest from PSS and involves collecting the various parts of Frank's body in the correct order. Spring coils are available to help you jump to different levels and various hazards such as ice, snakes and syringes impede your progress. It's not terribly original, but it's amusing and needs good planning for success.

Midway is a complex game of strategy with some real-time action. As Commander of all the American navy forces, your task is to defend the island of Midway which is all that stands between the Japanese fleet and the American coastline.

It's nice to see software released for micros like the Amstrad and Memotech, though the Amstrad is hardly short of new software these days. What a pity then that the bulk of the new stuff is, well, let's stick to 'unexciting' and hope for better things.

Educational

Osprey! was developed in conjunction with the RSPB and is a welcome change in games themes. Rather than taking potshots at scarce birds of prey, as in *Flying Feathers* (*PCN*, issue 64), it's more along the lines of *Ossie*. You have the responsibility of protecting the Osprey population of a Scots Loch and your duties include tourist control and keeping egg poachers and hunters at bay. There are ten levels of skill. The game comes with a 32-page colour brochure detailing the natural history of the Osprey in Scotland.

The game combines simulation (you can allocate numbers of wardens to different tasks) with graphics depictions of Lochside scenes. At £9.95 it's still worth the cost, even if the graphics are limited.

Utilities

QL Utilities is possibly the first third-party software for Sinclair's mixed-reception micro. The program offers single-key loading or deletion of files, auto cartridge multiple reformatting for maximum storage space and auto backup of all files from Microdrive to Microdrive.

Pilot is a little-known programming language and a version from Ariadne Software is now available for the Commodore 64. Though rather expensive at £26 and not very well documented, it's well worth considering as an alternative to CBM Basic. PCN

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Osprey	£9.95	Bourne Software 0794-523301
The Typist	£5.00	Dootson 07695-2727
Alien Break In	£6.99	Romik 0753-71535
Atom Smasher	£6.99	Romik 0753-71535
3D Monster Chase	£6.99	Romik 0753-71535

ATARI

Attack of the Mutant Camels	£7.50	Llamasoft 07356-4478

BBC

Paranoid Pete	£7.50	Ubik 091-284 0044
Osprey!	£9.95	Bourne Software 0794-523301
Dune Rider	£7.95	Micro Power 0532-458800
Answer Back Junior	£10.95	Kosmos 05255-3942
The Electronic Colouring Book	£9.95	Addison-Wesley 0734-794000

COMMODORE 64

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Strip Poker	£9.95	US Gold 021-520 7591
Mystic Mansion	£8.95	US Gold 021-520 7591
DT's Decathlon	£7.90	Ocean 061-832 6633
Pilot-Plus 64	£26.00	Sigma Technical Press 0243-784531
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Paranoid Pete	£5.50	Ubik 091-284 0044
Frank N Stein	£5.95	PSS 0203-667556
Eights	£1.99	Atlantis Software 01-226 6703
Astronomer	£9.95	CP Software 0895-31579
Beatcha	£5.99	Romik 0753-71535
Diseases of the Heart	£6.95	Medidata 01-204 2480

SINCLAIR QL

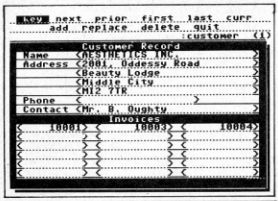
QL Utilities	£10.00	WD Software 0534-81392

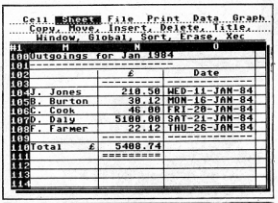
VIC 20

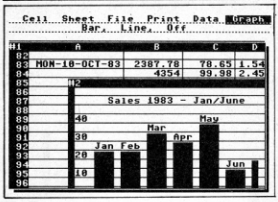
Galaxia	£5.99	Romik 0753-71535
Blockbuster	£5.99	Romik 0753-71535

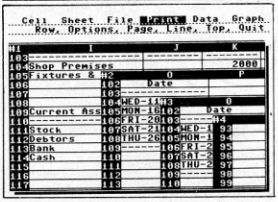
Vizastar can turn the Commodore 64 into a handy information management tool, says Neville Ash.

Viza's Virtuoso









Viza Software has now launched the first integrated software package for the Commodore 64.

Retailing at under £100, it provides the features of a program like *Lotus 1-2-3*, with spreadsheet, database and graphics facilities. *Vizastar* can also make use of data files from word processors like *Vizawrite*.

Essentially you're buying convenience. Rather than having to save data from an application like a spreadsheet, then load a word processor and load in that data file, there's just one program which covers database management, word processing, spreadsheet and graphics. Even if there's more than one disk, there's usually a common mode of operation: commands will be similar across the applications, making your learning curve that much steeper.

Getting started

The Vizastar package comprises a single disk, cartridge and manual. The cartridge is basically to prevent piracy, the original plan being to use just one disk. When using the cartridge, you have to make sure the machine is turned off before you insert it, as removing or inserting it with a live machine can ruin both micro and ROM.

To get to grips with the program you can either wade through the 120-page manual, or use the disk tutorial. While the former is comprehensive and steps through each feature in great detail, the latter is likely to prove more popular.

Features

Vizastar's spreadsheet has a maximum of 64000 cells, up to 1000 rows by 64 columns. There's a database with 1200 filing 'compartments', each capable of holding up to 124 characters and a graphics facility which can produce either line or bar graphs. A particularly useful feature is the ability to have whole sequences of commands processed via the 'exec' facility.

There are two versions of the program. The one tested was XL4 which has 4K RAM in the cartridge; Viza Software plans to release an 8K version in the near future.

Although most users of Vizastar will have a 1541 disk drive, the program can be used with the Commodore parallel/IEEE drives with an interface such as Interpod. The Centronics parallel standard is supported and you could use an RS232 printer, provided you have the appropriate interface.

In use

As soon as the program's loaded the worksheet display appears, the 'cell pointer' indicating the first cell in the matrix. The main menu, which appears on a single line at the top of the screen, is called up by pressing the Commodore logo key. The main menu has six options: Cell, Sheet, File, Print, Data and Graph.

The Cell command gives you four main operations. You can set the display format for a single entry, or for a range of cells. Choices here are General, Integer, Currency, Date and Scientific. General displays numbers within the current column width, or uses exponential notation. Integer rounds numbers to the nearest whole. Currency uses two decimal places and Date employs the DDMMYY format (day, month and year).

The Calc function sets the order of calculation, by row or column, and lets you toggle between automatic calculation after cell entry, or calculation on demand.

Protect can be used to prevent a cell, or row of cells, from being altered. Other useful Vizastar functions include automatic cursor movement, formula display and colour changing over major screen areas.

The second command in the main menu — Sheet — gives you ten further options. You can copy and move cell contents, insert rows or columns and 'freeze' a worksheet heading. A window command is available which can split the screen to show a maximum of nine different sections of the current model. It's also possible to sort or erase cells and to set global protection of entries.

The File option has four sub-sections with a range of three file suffices to handle data files for the worksheet, database or format for the latter. The Save command dumps the current sheet to disk, Load recalls a model, and Merge allows files to be loaded — these can be from worksheet, word processor, sequential file or disk file list.

The Maintenance option is for formatting disks, and it's a pleasure to be able to do this essential operation without leaving the program. Print handles printer output, with options for printing all or part of the sheet: rows, columns, pages and other options normally only found with dedicated word processors.

Data, the third option in the main menu, prepares Vizastar for information management. Database file names can be up to ten characters long and you may specify how the information is to be retrieved. Data can be transferred either from rows of the worksheet into database records, or database records can be loaded into a worksheet. Export allows you to send information in a database file to a standard CBM ASCII sequential file, field by field.

Finally, Graph is used to create bar or line charts from a worksheet or from database records, as shown in the illustrations.

Verdict

Vizastar is currently the only true integrated package for the Commodore 64 and makes the micro a far more practical and useful tool for information management than many other programs currently on the market. PCN

RATING (/5)

Features	5
Usefulness	5
Documentation	4
Performance	4
Usability	5
Reliability	4
Overall value	4

Name Vizastar **Price** £99.95 **Application** Integrated package **System** Commodore 64 **Publisher** Viza Software,, 9 Mansion Row, Brompton, Gillingham, Kent ME7 5SE 0634-813780 **Format** Disk & cartridge **Other versions** None **Outlets** Mail order/retail.

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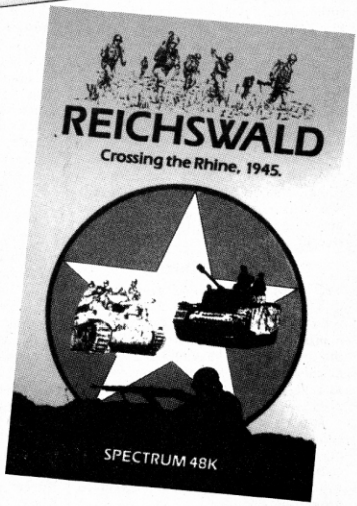

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David Rosam crunches numbers on a Dragon with Petite Pascal.

Personal Pascal

Unless you learned to program in an institute of higher education, it's almost 99 per cent certain that you cut your teeth on Basic. Basic is easy to learn and use — especially for the beginner, so it has become the universally accepted language for home micros.

If, on the other hand, you have a mainframe or a mini to play with, Basic looks a great deal less attractive. We've all heard the mutterings about the dire effect of too much Basic on our programming habits, and we've all got into huge muddles when trying to write longer programs. The answer, we are told, is to program in Pascal instead — and the introduction of *Petite Pascal* has now made this option open to all Dragon owners.

Documentation

The 41 pages of documentation are no more than average — and is there no software house out there which can spell? A little more effort and it could have been excellent. A demonstration cassette is supplied.

In use

The compiler loads quickly from cassette and only needs EXEC to be typed before it is ready for use. Don't be tempted to sit at the keyboard at this stage: Pascal is a structured language and places extra demands on you, the programmer. You are forced by the constraints of the language to go away and work out the whole program on paper before keying it in — but this does help to produce good programming.

Oasis has opted to use the Dragon's Basic editor, so programs written with this package are entered with line numbers and an apostrophe, a little like some of the cruder assemblers which ask you to enter the mnemonics in REM statements. Programs, then, don't look too much like those you may be familiar with from elsewhere.

The advantage of using the Basic editor is that no special editor has needed to be designed, which would also eat up some vital RAM space. I was surprised to see that, even after the program had been compiled, typing EDIT would allow me to edit or correct a line. The error messages are very clear, with an arrow indicating exactly where the mistake is.

A program written for use with the compiler looks like this:

```
100 'CONST NUM1=3; NUM2=4;   110 'VAR
    NUM3:INTEGER;
120 'BEGIN
130 'NUM3=NUM1+NUM2;
140 'WRITE (NUM3)
150 'END.
```

Compare it with the equivalent in Basic:

```
100 A=3+4
110 PRINT A
```

The Pascal program is far more long-winded, but don't be put off as you will reap the benefits when writing long programs — the ones that most benefit from structuring.

The first two lines of the Pascal program could be thought of as an extended remark; having to define all the constants and variables at the start gives a great deal of information to anyone looking at the program. The program itself is sandwiched between the BEGIN and END statements.

That's all I'm going to say about Pascal itself, because there's not enough space in this review — the manual lists a number of books which will help you to get to grips with it.

Typing RUN0 will compile the program and run it. The program is listed as it is compiled, with any output appearing on the screen below the compiled listing. Petite Pascal compiles very quickly, so the listing doesn't slow the program appreciably.

Verdict

Petite Pascal is a package that's very easy to use. It will enable many Dragon owners to dip into Pascal, and perhaps acquire some better programming habits which you hope will spill over into other programming. As an introduction it fills the bill, but be warned: it's not the same as the Pascals you'll find on mainframes.

ABS	AND	ARRAY	BEGIN	CALL	COLOUR	
CONST	DIV	DOWNTO	END	FOR	FUNC	
INKEY	GRAPHICS	INTEGER	MEM	MOD	OR	
PLOT	POINT	PROC	READ	SHL	SHR	
SQR	TEXT	TO	UNTIL	VAR	WRITE	

Pascal reserved words

```
IF . . . THEN . . . ELSE
WHILE . . . DO
CASE . . . OF
```

Pascal structures

As an end in itself, Pascal doesn't bear comparison with the Dragon's resident Basic. There are no high resolution graphics or sound commands, so if your interests lie in this direction you'll not find much satisfaction in this package. Oasis may have lost out on people who might want to take advantage of a language with increased speed without the dubious pleasures of learning machine code.

If, on the other hand, you wish to use your Dragon for somethng like data processing, Petite Pascal may be the answer — it'll soon whizz through any number crunching you set it.

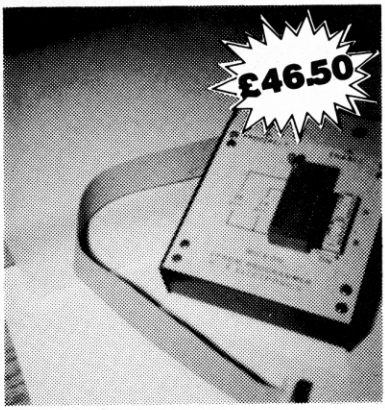
Another potential drawback is that once you've written your programs, you'll find your friends won't be able to run them without the Petite Pascal compiler, so you could find Pascal programming a solitary vice.

An interesting package, but I don't think Oasis will find themselves on the bestsellers lists with this one. PCN

RATING (/5)

Features	■■
Usability	■■■■
Documentation	■■■
Reliability	■■■■
Overall value	■■■

Name Petite Pascal **Application** Language compiler **System** Dragon **Price** £14.95 **Publisher** Oasis Software, Alexandra Parade, Weston-super-Mare, Avon BS23 1QT (0934 419921) **Format** Cassette **Other versions** None **Outlets** Retail/mail order.



A very high quality product direct from the manufacturers, contained in attractive sloping box with low insertion force socket and neon indicator for programming fitted as standard, the software adopts the high efficiency method for programming 2764 and 27128. This allows up to 100% faster programming, software in machine code, supplied on cassette and can be placed in Eprom. Very easy to use, menu driven with easy to use instructions. This unit is completely self contained with its own power supply and plugs into the user port.

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OVERSEEING WITH OZ

The path to a smoothly run business may be the yellow brick road of Oz. Ian Scales takes a stroll.

Oz is described as a 'management control system'. It undertakes financial monitoring, which is a sort of financial modelling in reverse. It's the sort of job many users probably try to use their spreadsheets for, with indifferent results.

The application involves monitoring already decided business goals (rather than determining these goals — the province of the spreadsheet) and seeing if and where shortfalls are occurring. The user sets up a list of targets in each area of operations over a year and then charts the actual figures against them.

The program works on an IBM PC or close clone with 256K, colour is an attractive option and the program costs £330.

Features

Oz doesn't use a single worksheet of rows and columns, but separately displayed files of cells for individual entities — sales, wages, office expenses etc. All these fit into a hierarchical relational structure based on parent/offspring/sibling relationships between departments within an organisation.

Oz provides a coherent structure to monitor closely and understand a company's particulars as well as the broad sweep of its performance. You can make notes on variances in figures to accompany an entry (*eg* 'dock strike incurred delivery penalties' could accompany a variance in sales profits in a certain month).

Overall performance can be determined by consolidating data into profit and expense totals. Data can be analysed by variance and comparison and the results displayed by graph. Reports can be generated and stored and formats recalled. Communications facilities are included to allow the importation of files from Multi-Plan, Lotus 1-2-3 and others.

Documentation

I had thought that the days of makeshift documentation were over but, unfortunately, Fox and Geller seems to be a software traditionalist. The first batch of programs is being sent out with photocopied manuals and a correction sheet with no fewer than 18 updates although typeset versions are being prepared as I write.

Sadly, Oz is let down by a single, rather confused manuscript which tries to cover everything in the 'do this when you're doing that and if that happens then do this except if this has already happened then you're in trouble and you have to do this' style. A tutorial on disk with supporting guide has been included as an attempt at balance, but it would be nice to see as much information on the application itself as on the nuts and bolts of the program.

In use

Oz has the normal help facilities and on-screen prompts and the whole thing (documentation aside) functions very efficiently.

You are greeted with a series of menus on your way into the system which tell you the model is created from the top down. The lines files section displays the entities for revenues and expenses — products, salaries, rent etc — and further computations are expressed in this display to identify net and gross profit lines, for example, or total expenses.

An organisation chart is provided and defined by the user. At the base of the chart are the elementary organisations (the departments with no sub-departments) and each of these has an accompanying data file to hold the various facts and figures by which the organisation's performance is measured — for example, the sales department will have a string of monthly sales figures (budgeted, forecast and actual) attached to it.

The non-elementary departments are the parents to the elementaries — these consolidate data from their elementary child departments so overall or regional performance figures can be intercepted by the user on their way to the 'bottom line' at the top of chart — the net profit line in the lines file.

The consolidation, reporting and analysis functions tend to be very disk-active and are not to be entered into lightly.

The above description illustrates the complexity of the package, but the real issue in evaluating an application as different as Oz is not to ask 'how well does it do its job?' but 'how good a solution is the job itself in a typical business situation?'

Oz is really about structuring, in one program, a whole range of functions which would normally have to be 'tailored' by the user, perhaps from a spreadsheet or database (low-level but flexible), or an integrated software package.

However, Oz provides a solution for one problem rather than a tool for many and I suspect that companies not dealing in neat, statistically-valid volumes of sales over monthly periods (especially enterprises involved in providing high-value, low-volume goods or services) are going to have a few problems shaping the system into a usable form. It's so structured there seems little room to manoeuvre.

Verdict

Oz is a very ambitious program. It's obvious that it could find a happy home in the middle of an integrated program suite and it's not beyond the bounds of possibility that somebody will write something very like it for Lotus' *Symphony*.

The worrying thing about Oz is the necessary degree of rigidity in the package. As I mentioned before, Oz has to make certain assumptions — the existence of a predefined company structure, the likelihood that it is going to be selling items, hiring employees, comparing projected, actual and budgeted figures, and so on. In many situations Oz is undoubtedly going to be a great asset. It's very powerful and well thought out and its processes make great sense for the textbook sales-based company. For companies whose operations happen to be less standard I think it's worth a careful look — with the emphasis on 'careful'.

RATING (/5)

Features	5
Documentation	1
Performance	3
Usability	2
Reliability	3
Overall value	3

Name Oz (management control) **Price** £330 plus VAT **System** IBM PC/XT or clone with PC DOS, MSDOS **Format** Disk **Distributor** Fox and Geller UK, Tel 01-580 5816.

SPECTRUM 48K

Manic mechanic

Name Automania **Price** £6.95 **System** Spectrum 48K **Publisher** Micro-Gen 0344 427317 **Format** Cassette **Other versions** None **Outlets** Retail.

Wally Week is here. No, it's not, a week for wally activities, like the silly season in Fleet Street. Wally Week is merely the hero.

Objectives

Wally must put ten cars together, each of which has six components which he must collect from the store room and take to the assembly area.

In play

There's an option of musical accompaniment, which sounds like the Laurel and Hardy theme. There's a demo mode which pulls up a credit screen: Lighting by Eddy's Son etc.

Wally starts at bottom left of the store room. There are three levels and three ladders, one central at the lowest level, the other two at left to right leading from the second to third levels. The platforms forming the second and third floors are shown as two cross-hatched gangplanks whose ends move towards and away from the middle. As each different car is completed, the layout of the store room changes and Wally gains an extra life.

On the lowest level two wheels wobble from side to side, crossing at the foot of the ladder, while what looks for all the world like a hover-tele moves from left to right and back. Naturally, you must jump over these, as well as static items such as kettles and cans of oil which can fatally trip you up.

The first item to collect from stores may be, for example, something like the lower half of a nearside door, though sometimes it's difficult to recognise the part until it's fitted to the car. Collecting the first component involves climbing the central ladder, jumping right to one of the tricky moving gangplanks, and you're there. Moving over an item picks it up automatically.

With parts collected, it's back down the ladder to the assembly room where the screen is much the same. Additional hazards are cooling fans, pistons with swinging con-rods, nuts and bolts or learner plates which fall at random from the ceiling. It's best to avoid letting these land on you — the result is RIP and loss of one of Wally's three lives

In the assembly area, Wally takes the part to the car, leaping into the air to position upper parts. Each piece has a time limit, so those bits in the further regions of the store room are especially tricky.

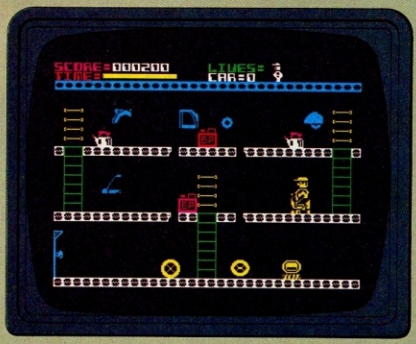
Verdict

It's not an easy game, but the lack of variation will deter many from going for Mechanic of the Year.

Bryan Skinner

RATING (/5)

Playability	
Lasting appeal	
Use of machine	
Overall value	



Pass the castle

Name Rapscallion **System** Spectrum 48K **Price** £6.95 **Publisher** Bug-Byte, Mulberry House, Canning Place, Liverpool L1 8JB 051-709 7071 **Format** Cassette **Other versions** None **Outlets** Retail.

Fancy being a bird or a fly in an arcade/adventure game? Unusual perhaps, but that's the scenario in this game.

Objectives

You've been deposed from your lordly position as King of Hassle Castle by your arch-enemy Rapscallion the Rogue. You've got to regain your rightful place by overcoming Rapscallion and getting your name back on the title deeds.

In play

There are seven screens of information before you get started, but the skip function lets you jump straight into the game.

The starting screen has you imprisoned in the dungeon by the Rogue, until the Fairy Princess enters and magically transforms you into a bird, to help you get revenge on your captor. She also grants you six lives in your new incarnation. You start off in the Wilderness, and to get to the Magic Labyrinth you have to find the pixies who will help you by gifts of the magic eye, or key. Random diamonds give you clues as to their whereabouts. If you master the Labyrinth there's still the Castle to contend with — plenty of variety here.

Each location has a rectangular boarder with anything between two and nine exits and entrances. Moving left from The Dungeon you enter The Body Crusher where a spiked bar moves up and down, making an exit to top left tricky. It's a good idea to find a source of sparks or fire as soon as possible, because these speed you up and make it easier to avoid some of the nastier hazards' — but avoid letting things drop on your head as this will slow you down.

If you make it under the Crusher you'll find yourself in Target Practice, with two soldiers taking pot-shots at you — one way to avoid being potted is to change into a fly as soon as you enter, which costs you a life and presents you with a different set of hazards.

If you do get hit, you metamorphose into a ghost, and are then free to wander round the rooms without risk, but gaining valuable knowledge about the relative positions of the rooms. To regain your body you locate the ghost over your dead self, then press the character change key, one or zero.

Verdict

Bug-byte has produced a very clever game. Although each screen is a bit bare there are many of them, and some are extremely difficult. The diamonds and pixies are randomly placed each time you play, so while you might learn the room layouts fairly quickly, you'll still have to dodge about to collect the essential ingredients for a successful attack on the Rogue. Recommended. **Bryan Skinner**

RATING (/5)

Playability	
Lasting appeal	
Use of machine	
Overall value	

BBC games are increasingly available for the Electron. Bob Chappell peruses a few of the best.

Acorn attraction

CYLON ATTACK

Conflict among the stars is the theme of this impressive perspective space battle. From the cockpit of your interceptor, you have a wide-angled view of the galaxy. Slap in the middle of the star-spangled sky is your yellow cross-sight with which you take a bead on the attacking aliens that scud around this part of the galaxy.

Though you don't travel forward to meet the enemy, your view of the action can be shifted by turning your craft to the left or right, and by climbing up or down. The heavens shift swiftly and silkily around in response to the controls. Somewhere out there is a yellow mother ship — line up your sights on it (but don't shoot) and it appears to move rapidly towards you for docking and vital refuelling. But you're wide open to attack from the enemy.

To help you track down the four different types of alien craft, a radar device at the top of the screen displays all movement in the near vicinity. When in view, your antagonists hurtle towards you, launching chunky rockets as they loom even larger. When you receive a direct hit, electronic explosions rend the air and the screen turns red and shakes alarmingly. You can strike back with twin lasers that head unerringly for the spot where your cross-sight was when you pushed the button.

Beautifully smooth action, good perspective views and zappy space sounds result in an excellent game of galactic dog-fighting.

FRUIT MACHINE

And now for something far more relaxing — unless, that is, one-armed bandits have a worse effect on your adrenalin flow than cosmic guerillas.

Here you play an addictive fruit machine with neither the discomfort of a noisy, crowded arcade nor the pain of losing real, live money. On the other hand, since you can't win real live money, your heart doesn't exactly do a triple somersault when you hit the jackpot.

Nevertheless, this is a very good simulation. It is a three-barrelled machine, with three pictures displayed per reel at any one time. The line on which winnings are paid out is the bottom one, rather than the more traditional middle row. The pictures include attractively drawn fruit (cherries, plums, melons, and so on) along with bells and the trade logos of the BBC and Superior Software.

There are a few simple sound effects, and playing features include hold, gamble and nudge, the latter requiring a pretty nifty bit of keying if you're to hit the big time. You start with 20 credits — if that runs out, game over and you start afresh.

A superior gambling simulation and a painless way to learn that the machine always wins in the end.

GHOULS

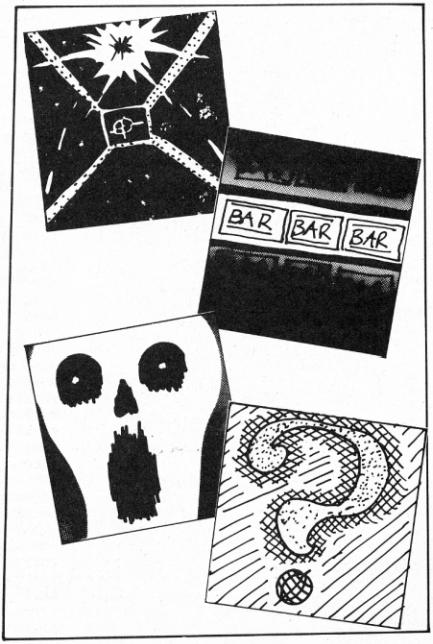
Back to pitting your many wits against something that is after more than your money. To lull you into a peaceful frame of mind before proceeding to hammer the living daylights out of you, this game plays classical music while it loads into the main program.

Set in a haunted house, this is a sort of Manic Miner with ghosts. A series of platforms must be scaled by a little yellow dumpling on legs. Right at the top is a box of jewels which you must reach before you can progress. Along the platforms are various edible yellow dots to boost your score while deadly spikes, moving ghouls and bouncing spiders boost your blood pressure.

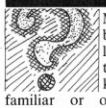
Gobbling up the single stray Power Jewel sends the ghouls off for tea for about 15 seconds. Other difficulties include gaps in the platforms (you turn into custard if you fall), contracting floorboards, moving platforms, and giant springs. There are four different screens — Spectre's Lair, Horrid Hall, Spider's Parlour and Death Tower.

Your little character moves fast, running and jumping left and right. Controlling him via the keyboard requires skill — there's no joystick option.

The game has some superb sound effects — delightfully ghoulish — with good graphics and fast and varied play. It provides a real challenge and is likely to maintain its lasting appeal.



WORLD GEOGRAPHY



More soothing, but no less challenging, is this test of your knowledge of familiar or obscure world capitals.

You may elect to name capital cities with an option, for those who really know their stuff, to say how big each country's population is — are you that clever?

Filling most of the screen is a neatly drawn, simplified map of the world which stays on screen all the time. The questions and answers are dealt with in the lower part of the screen. When a question is put, a flashing blob illuminates the position on the map. There are eight categories of difficulty, the questions ranging from 'What is the capital of France?' to 'What is the capital of Tuvalu?' (the answer is Funafuti — as Michael Caine might say, not many people know that). Capital entertainment. PCN

Cylon Attack (BBC and Electron, £7.90) A & F Software, Rochdale (0706) 34111
Fruit Machine, World Geography (BBC and Electron, £7.95) Superior Software, Leeds (0532) 842714
Ghouls (BBC B and Electron, £9.75) Program Power, Leeds (0532) 458800.

CUPID BOUNCES BACK

Title: *Cupid bounces back*
Machine: *Oric 1*
Language: *6502 machine code*
Application: *Game*
Author: *Timothy Green*

Timothy Green from Trowbridge in Wiltshire has sent us the sequel to his program *Cupid's Arrow* published in issue 13 of *PCN*. *Cupid bounces back*, for the Oric 1, is written entirely in machine code and at the fastest speed you certainly need all your wits about you.

You are Cupid and out of the kindness of your heart have taken on the task of helping some lovesick Romeos across a garden and over two garden walls to where their sweethearts patiently wait. As they enter the back garden, an alarm is triggered and deadly arrows start to emerge from the ground and then sink down again, making the traversal very tricky. Luckily these ardent Romeos are equipped with pogo sticks, and by timing their jumps very carefully, they can jump over the arrows and arrive safely at the garden wall.

The multi-coloured ground determines how high the Romeos are able to jump, but if you are unlucky you might hit a hole in the ground, and that means curtains for Romeo. As Cupid you are allocated a certain amount of freeze power which you can use to freeze Romeo in the air while the arrows sink into the ground — at which point he can leap forward.

There are nine levels of difficulty, and the hardest is practically impossible. All you can do is take a flying leap and hope for the best, which isn't often very productive. Each Romeo has three lives, though you might like to try poking $1294 with a value greater than three as it holds the number of lives. Be careful when poking with a number much greater than three, as the graves will overwrite the display. Location $1389 corresponds to how many arrows have to be jumped over and if you wish to change this (originally set at four) you must poke this location with an even number greater than zero, or the Oric may crash.

Instructions on typing and saving the program are as follows. First type in listing 1 exactly as shown (all £ signs should be # signs) — don't run the program or your Oric will crash. Save the program and then type in listing 2. When you have finished typing in listing 2, run it and correct any mistakes, (check sums are included), then save it. After running listing 2 type the following as direct commands:

```
FOR A=0 TO 450 : B=PEEK(28784+A) : POKE4207+A,B:NEXT A FOR A=0 TO 1800 : B=PEEK(29265+A) : POKE4689+A,B : NEXT A
```

Now type CSAVE Program name",A4207,E6500 to save the machine code on to tape. Then type NEW (don't turn the Oric off before doing so) and load in listing 1. Type DOKE #9C,6500 and CSAVE "CUPID B/B" and the complete program will be saved on tape.

Program 1

```
10 CLS:LORES0:PLOT 9,0,"CUPID BOUNCES BA
CK.":PLOT 6,0,0:CALL £F89B
20 RESTORE:FOR A=1 TO 24:READ A$:PLOT 1,
A,A$:NEXT A
25 IF DEEK(£7FF6)=21845 THEN CALL £1286
ELSE CALL £128E
27 GOTO 10
30 DATA "    In this game you,Cupid,have
to help"
32 DATA "a group of romantic romeos in r
eaching"
34 DATA "their sweethearts.Unfortunately
,not"
36 DATA "having the brains to match thei
r looks"
38 DATA "they enter their sweetheart's h
ome by"
40 DATA "the back gate,so setting off a
burglar"
42 DATA "device which causes deadly arro
ws to"
44 DATA "move up and down and makes the
ground"
46 DATA "rotate and disappear when touch
ed."
48 DATA "    Before a Romeo can meet his
sweet-"
50 DATA "heart he has to reach 2 garden
walls."
52 DATA "To get to each wall he must avo
id the"
54 DATA "arrows and not fall into the gr
ound."
56 DATA "Luckily,foreseeing complication
s,every"
58 DATA "romeo has come equipped with a
pogo-"
60 DATA "stick,enabling them to bounce o
ver the"
62 DATA "arrows,along the garden and on
to the"
64 DATA "next wall.How high they go depe
nds on"
66 DATA "the colour of the ground when h
e hits"
68 DATA "it.As Cupid,you can freeze any
romeo"
70 DATA "in mid-air for a certain time d
uring"
72 DATA "each garden making life much ea
sier."
74 DATA "          **** Keys to use. ****
"
76 DATA "(1) MOVE FORWARD.....(2) FREEZ
E ROMEO"
```

PCN PROGRAMS: ORIC 1

Program 2

```
 10 TEXT
 20 C=0:FOR A=1 TO 448:READ B:POKE £7070
+A,B:C=C+B:NEXT A
 25 IF C<>25024 THEN PRINT"DATA ERROR":S
TOP
30 DATA 5 ,70 ,82 ,69 ,69 ,90 ,69 ,32 ,8
0 ,79 ,87
40 DATA 69 ,82 ,3 ,62 ,254 ,254 ,254 ,25
4 ,254 ,254 ,254
50 DATA 254 ,254 ,254 ,254 ,254 ,254 ,25
4 ,254 ,254 ,254 ,254
60 DATA 254 ,254 ,32 ,6 ,83 ,67 ,79 ,82
,69 ,58 ,176
70 DATA 176 ,176 ,176 ,32 ,32 ,72 ,73 ,4
5 ,83 ,67 ,79
80 DATA 82 ,69 ,58 ,176 ,176 ,176 ,1^6 ,
2 ,76 ,73 ,86
90 DATA 69 ,83 ,32 ,32 ,32 ,32 ,12 ,7 ,8
0 ,82 ,69
100 DATA 83 ,83 ,32 ,75 ,69 ,89 ,32 ,34
,92 ,34 ,32
110 DATA 84 ,79 ,32 ,83 ,84 ,65 ,82 ,84
,32 ,5 ,3
120 DATA 1 ,1 ,1 ,3 ,5 ,6 ,8 ,8 ,8 ,5 ,1
0
130 DATA 10 ,10 ,3 ,8 ,8 ,8 ,5 ,3 ,1 ,1
,1
140 DATA 3 ,5 ,6 ,8 ,8 ,8 ,5 ,8 ,6 ,5 ,3

150 DATA 1 ,10 ,10 ,20 ,20 ,10 ,10 ,10 ,
10 ,20 ,20
160 DATA 20 ,20 ,20 ,20 ,20 ,20 ,20 ,20
,20 ,10 ,10
170 DATA 20 ,20 ,10 ,10 ,10 ,10 ,20 ,20
,20 ,20 ,20
180 DATA 20 ,20 ,20 ,20 ,1 ,0 ,0 ,0 ,1 ,
0 ,0
190 DATA 1 ,12 ,5 ,80 ,108 ,101 ,97 ,115
 ,101 ,32 ,101
200 DATA 110 ,116 ,101 ,114 ,32 ,115 ,10
7 ,105 ,108 ,108 ,32
210 DATA 40 ,49 ,45 ,57 ,41 ,46 ,32 ,32
,6 ,49 ,61
220 DATA 72 ,97 ,114 ,100 ,101 ,115 ,116
 ,46 ,46 ,46 ,46
230 DATA 46 ,57 ,61 ,69 ,97 ,115 ,105 ,1
01 ,115 ,116 ,38
240 DATA 2 ,0 ,0 ,0 ,0 ,0 ,62 ,16 ,0 ,0
,64
250 DATA 6 ,0 ,152 ,0 ,0 ,0 ,0 ,0 ,0 ,62
 ,16
260 DATA 0 ,0 ,200 ,0 ,1 ,10 ,87 ,97 ,10
8 ,108 ,32
270 DATA 82 ,101 ,97 ,99 ,104 ,101 ,100
 ,32 ,20 ,66 ,111
280 DATA 110 ,117 ,115 ,32 ,111 ,102 ,0
 ,32 ,32 ,32 ,16
290 DATA 5 ,10 ,71 ,65 ,77 ,69 ,32 ,79 ,
86 ,69 ,82
300 DATA 7 ,17 ,80 ,82 ,69 ,83 ,83 ,32 ,
65 ,78 ,89
310 DATA 32 ,75 ,69 ,89 ,32 ,84 ,79 ,32
 ,83 ,84 ,65
320 DATA 82 ,84 ,32 ,65 ,32 ,78 ,69 ,87
 ,32 ,71 ,65
330 DATA 77 ,69 ,32 ,16 ,31 ,31 ,31 ,0 ,
59 ,59 ,59
340 DATA 0 ,3 ,3 ,7 ,3 ,1 ,35 ,35 ,39 ,4
7 ,43
350 DATA 51 ,35 ,39 ,46 ,44 ,44 ,44 ,60
 ,32 ,32 ,32
360 DATA 32 ,32 ,32 ,63 ,63 ,63 ,0 ,0 ,0
 ,0 ,0
370 DATA 0 ,8 ,28 ,62 ,8 ,8 ,8 ,8 ,8 ,8
 ,8
380 DATA 8 ,8 ,8 ,8 ,8 ,8 ,8 ,62 ,62 ,8
 ,8
390 DATA 8 ,8 ,0 ,0 ,14 ,30 ,30 ,20 ,46
 ,10 ,10
400 DATA 9 ,14 ,14 ,31 ,4 ,4 ,6 ,6 ,87 ,
69 ,76
410 DATA 76 ,32 ,68 ,79 ,78 ,69 ,46 ,78
 ,79 ,87 ,32
420 DATA 84 ,82 ,89 ,32 ,65 ,32 ,72 ,73
 ,71 ,72 ,69
430 DATA 82 ,32 ,76 ,69 ,86 ,69 ,76 ,46
 ,85 ,85 ,85
 500 X=£7251:C=0
 505 READ A$:IF A$="END" THEN READ A,B,D
 510 IF A$="END" AND C<>A THEN PRINT "DA
TA ERROR IN:"B,D:STOP
 520 IF A$="END" AND C=A THEN C=0:READ A
$
 530 V=VAL("£"+A$):C=C+V:POKE X,V:X=X+1:
GOTO 310
540  DATA A9,25,A0,01,91,03,20,59,17,A9
550  DATA 24,91,03,20,00,14,A2,22,BD,0D
560  DATA 12,9D,63,BD,CA,D0,F7,AD,F5,7F
570  DATA C9,10,F0,06,38,E9,10,BD,F5,7F
580  DATA A2,96,20,12,E6,60,20,F0,12,20
590  DATA EC,14,60,A9,00,8D,F6,7F,8D,F7
600  DATA 7F,A9,0A,8D,6A,02,A9,03,8D,F1
610  DATA 7F,4C,4A,14,A9,01,8D,0B,04,AE
620  DATA 02,04,E8,E8,E8,8A,20,A9,13,20
630  DATA 18,F4,AC,09,04,A9,7D,99,CB,BE
640  DATA A2,FA,20,12,E6,AC,F1,7F,88,F0
650  DATA END,12740 ,540 ,640
650  DATA 0A,8C,FB,7F,8C,F1,7F,4C,A1,13
660  DATA 60,8C,CC,BB,A2,0B,BD,8D,11,9D
670  DATA 7E,BC,9D,A6,BC,CA,D0,F4,A2,25
680  DATA BD,98,11,9D,EA,BC,CA,D0,F7,AD
690  DATA 08,02,C9,38,F0,F9,60,EA,EA,A2
700  DATA 00,BD,BE,11,9D,B0,B7,E8,E0,40
710  DATA D0,F5,60,EA,EA,A9,F0,85,03,A9
720  DATA BE,85,04,AE,02,04,A0,03,A9,F6
730  DATA 91,03,88,D0,F9,A9,06,91,03,20
740  DATA 59,17,CA,D0,ED,A2,0E,BD,70,11
750  DATA 9D,7B,BC,9D,A3,BC,BD,7F,11,9D
760  DATA END,15586 ,650 ,750
760  DATA F4,BC,CA,D0,EE,8E,F2,7F,A2,21
770  DATA BD,E1,BB,C9,FE,D0,03,20,E0,14
780  DATA CA,D0,F3,AE,FF,7F,AC,02,04,20
790  DATA E0,14,88,D0,FA,CA,D0,F4,AD,F2
800  DATA 7F,4A,4A,4A,4A,18,69,30,8D,FF
810  DATA BC,AD,F2,7F,29,0F,18,69,30,8D
820  DATA 00,BD,F8,AD,F8,7F,18,6D,F2,7F
830  DATA 8D,F8,7F,AD,F9,7F,69,00,8D,F9
840  DATA 7F,D8,20,7B,16,EA,EA,EA,AD,FF
850  DATA 7F,C9,04,F0,08,EE,FF,7F,EE,FF
860  DATA 7F,D0,08,A9,02,8D,FF,7F,20,51
870  DATA END,16295 ,760 ,860
870  DATA 12,A2,F0,20,12,E6,20,E6,15,EA
880  DATA 4C,CF,14,60,0A,0A,0A,BD,03,04
890  DATA A9,00,8D,FB,7F,8D,FC,7F,A2,EC
900  DATA A0,FA,20,6C,FA,20,00,15,AC,09
910  DATA 04,A9,20,99,1B,BF,99,43,BF,99
920  DATA 6B,BF,A0,08,BC,01,04,A9,64,38
930  DATA ED,02,04,AA,A9,00,20,35,F5,A2
940  DATA 01,20,12,E6,CE,03,04,AC,01,04
950  DATA 88,D0,E3,AD,03,04,D0,CB,60,48
960  DATA 20,7F,12,68,60,EA,EA,EA,EA,EA
970  DATA EA,A2,00,8E,F2,7F,BD,D1,10,8D
980  DATA END,12594 ,870 ,970
980  DATA E5,02,A9,01,BD,E1,02,A9,02,8D
990  DATA E3,02,A9,00,BD,E7,00,20,24,F4
1000  DATA A0,08,B9,18,11,99,E0,02,88,D0
1010  DATA F7,AE,F2,7F,BD,F5,10,0A,0A,0A
1020  DATA 0A,0A,8D,E7,02,20,21,F4,AC,F2
```

```
1020  DATA 0A,0A,8D,E7,02,20,21,F4,AC,F2
1030  DATA 7F,BE,F5,10,20,12,E6,98,AA,E8
1040  DATA E0,24,D0,B9,60,20,A9,E9,A2,1C
1050  DATA BD,20,11,9D,94,BF,CA,D0,F7,8E
1060  DATA FC,7F,E8,8E,FB,7F,A2,18,8D,3D
1070  DATA 11,9D,BE,BF,CA,D0,F7,A9,20,8D
1080  DATA C5,BB,A9,20,8D,DF,02,EE,F4,7F
1090  DATA END,14666 ,980 ,1080
1090  DATA AD,F4,7F,29,07,F0,09,EA,EA,EA
1100  DATA 18,69,10,8D,B1,BB,AD,C4,BB,48
1110  DATA A2,12,BD,B1,BB,9D,B2,BB,CA,D0
1120  DATA F7,68,8D,B2,BB,AD,DF,02,29,7F
1130  DATA C9,31,30,06,C9,3A,10,02,30,07
1140  DATA A2,1E,20,12,E6,F0,C4,20,F4,13
1150  DATA 38,E9,30,0A,0A,0A,0A,8D,F5,7F
1160  DATA A9,02,8D,FF,7F,A9,10,8D,6B,02
1170  DATA A9,03,8D,6C,02,20,DE,15,A9,14
118~  DATA 8D,FA,7F,A9,00,8D,F4,7F,8D,10
1190  DATA 04,20,BD,16,60,F8,AD,F2,7F,18
1200  DATA END,13167 ,1090 ,1190
1200  DATA 69,01,8D,F2,7F,D8,60,A2,00,BD
1210  DATA FE,11,9D,20,B5,EB,E0,10,D0,F5
1220  DATA 60,EA,EA,EA,EA,EA,EA,AD,FC,7F
1230  DATA D0,3C,20,C3,18,AD,FB,7F,F0,03
1240  DATA CE,09,04,AD,07,04,85,03,AD,08
1250  DATA 04,85,04,AD,0B,04,C9,01,F0,0C
1260  DATA 20,59,17,20,59,17,EE,02,04,EE
1270  DATA 02,04,CE,02,04,20,4B,17,A5,03
1280  DATA 8D,07,04,A5,04,8D,08,04,20,97
1290  DATA 18,60,AD,FA,7F,F0,BF,AC,FA,7F
1300  DATA A9,20,99,E1,BB,CE,FA,7F,98,0A
1310  DATA END,12817 ,1200 ,1300
1310  DATA 0A,0A,8D,64,11,A2,64,A0,11,20
1320  DATA 6C,FA,60,AC,F5,7F,AD,08,02,C9
1330  DATA A8,D0,03,8D,FB,7F,C9,B2,D0,03
1340  DATA 8D,FC,7F,88,D0,EC,60,AD,F8,7F
1350  DATA 4A,4A,4A,4A,18,69,B0,8D,B4,BB
1360  DATA AD,F8,7F,29,0F,69,B0,8D,B5,BB
1370  DATA AD,F9,7F,4A,4A,4A,4A,18,69,B0
1380  DATA 8D,B2,BB,AD,F9,7F,29,0F,69,B0
1390  DATA 8D,B3,BB,60,A2,56,A0,11,20,6C
1400  DATA FA,60,AD,F6,7F,4A,4A,4A,4A,18
1410  DATA 69,B0,8D,C3,BB,AD,F6,7F,29,0F
1420  DATA END,14194 ,1310 ,1410
1420  DATA 69,B0,8D,C4,BB,AD,F7,7F,4A,4A
1430  DATA 4A,4A,18,69,B0,8D,C1,BB,AD,F7
1440  DATA 7F,29,0F,69,B0,8D,C2,BB,60,A9
1450  DATA 00,8D,F8,7F,8D,F9,7F,20,7F,F9
1460  DATA 20,67,17,20,C0,17,20,E3,18,20
1470  DATA F5,18,60,EA,AD,F7,7F,CD,F9,7F
1480  DATA 30,0C,F0,01,60,AD,F8,7F,CD,F6
1490  DATA 7F,10,01,60,AD,F9,7F,8D,F7,7F
1500  DATA AD,F8,7F,8D,F6,7F,60,AD,09,04
1510  DATA F0,6E,20,00,15,AD,FA,7F,F0,05
1520  DATA AD,FC,7F,D0,5A,AD,0A,04,D0,56
1530  DATA END,14606 ,1420 ,1520
1530  DATA AD,02,04,C9,01,D0,27,20,A7,15
1540  DATA A9,00,8D,11,04,AC,09,04,B9,F3
1550  DATA BE,C9,10,F0,3D,B9,F3,BE,38,E9
1560  DATA 0F,8D,0F,04,A9,10,99,F2,BE,A9
1570  DATA 02,8D,0B,04,D0,27,CD,0F,04,D0
1580  DATA 22,A9,01,8D,0B,04,F8,AD,F8,7F
1590  DATA 18,6D,0F,04,8D,F8,7F,AD,F9,7F
1600  DATA 69,00,8D,F9,7F,D8,20,7B,15,~0
1610  DATA F7,15,20,AF,15,60,A9,02,8D,F4
1620  DATA 7F,60,A9,01,8D,F4,7F,60,20,10
1630  DATA 18,20,2A,18,20,6D,18,AD,0A,04
1640  DATA END,11445 ,1530 ,1630
1640  DATA D0,18,A9,00,8D,FC,7F,8D,FB,7F
1650  DATA AE,F5,7F,BE,0D,04,20,60,15,AE
1660  DATA 0D,04,CA,D0,F4,60,A9,02,8D,F4
1670  DATA 7F,60,20,18,16,AD,F4,7F,C9,02
1680  DATA F0,06,C9,01,F0,05,D0,06,4C,9B
1690  DATA 12,4C,00,13,20,91,16,AD,F4,7F
1700  DATA C9,02,F0,06,C9,01,F0,05,D0,06
1710  DATA 4C,9B,12,4C,00,13,4C,BD,16,EA
```

```
1720  DATA EA,EA,EA,EA,EA,EA,EA,EA,EA,EA
1730  DATA EA,EA,EA,EA,EA,EA,EA,EA,EA,A0
1740  DATA 00,BC,60,9E,AD,08,03,4D,00,04
1750  DATA END,14073 ,1640 ,1740
1750  DATA 6D,76,02,8D,00,04,8D,60,9E,EA
1760  DATA EA,EA,EA,EA,60,A9,00,8D,60,9E
1770  DATA A2,08,8E,62,9E,20,00,17,AD,60
1780  DATA 9E,18,6D,61,9E,8D,61,9E,AE,62
1790  DATA 9E,CA,D0,EA,A2,01,AD,61,9E,29
1800  DATA 7F,38,ED,63,9E,30,03,E8,D0,F7
1810  DATA 8A,EA,EA,60,A5,03,18,69,28,85
1820  DATA 03,A5,04,69,00,85,04,60,A5,03
1830  DATA 38,E9,28,85,03,A5,04,E9,00,85
1840  DATA 04,60,AC,FF,7F,8C,01,04,A9,04
1850  DATA 8D,63,9E,20,1A,17,AA,BD,A3,BE
1860  DATA END,12567 ,1750 ,1850
1860  DATA C9,7B,10,F5,8A,AE,01,04,9D,00
1870  DATA 10,A9,14,8D,63,9E,20,1A,17,AE
1880  DATA 01,04,9D,23,10,20,9C,17,AC,01
1890  DATA 04,88,D0,CF,60,AA,A9,CB,85,03
1900  DATA A9,BE,85,04,8E,02,04,AE,01,04
1910  DATA BC,00,10,A9,7C,91,03,20,59,17
1920  DATA AE,02,04,CA,D0,EA,A9,7B,91,03
1930  DATA 60,AE,FF,7F,A9,02,9D,46,10,CA
1940  DATA D0,FA,EA,A9,14,8D,63,9E,A2,21
1950  DATA 8E,01,04,20,1A,17,18,69,10,AE
1960  DATA 01,04,9D,F3,BE,CA,D0,EE,A2,22
1970  DATA END,11447 ,1860 ,1960
1970  DATA A9,10,9D,F3,BE,EA,A9,D6,85,03
1980  DATA A9,BD,85,04,A2,07,8A,18,69,10
1990  DATA A0,00,91,03,A9,10,C8,91,03,20
2000  DATA 4B,17,CA,D0,ED,A9,7A,8D,75,BE
2010  DATA 60,A2,21,BD,F3,BE,48,EA,EA,A2
2020  DATA 20,BD,F3,BE,9D,F4,BE,CA,D0,F7
2030  DATA 68,EA,EA,8D,F4,BE,60,AE,FF,7F
2040  DATA A9,F3,85,03,A9,BE,85,04,BC,00
2050  DATA 10,20,59,17,B1,03,C9,7B,D0,F7
2060  DATA BD,46,10,C9,02,F0,16,A9,7C,91
2070  DATA 03,20,59,17,B1,03,C9,79,D0,03
2080  DATA END,14537 ,1970 ,2070
2080  DATA BD,0A,04,A9,7B,91,03,D0,0B,A9
2090  DATA 20,91,03,20,4B,17,A9,7B,91,03
2100  DATA CA,D0,C1,60,AE,FF,7F,BD,46,10
2110  DATA C9,01,F0,06,DE,23,10,DE,23,10
2120  DATA FE,23,10,BD,23,10,D0,05,A9,01
2130  DATA 9D,46,10,C9,07,D0,05,A9,02,9D
2140  DATA 46,10,CA,D0,DA,60,A9,00,8D,0A
2150  DATA 04,AD,07,04,85,03,AD,08,04,85
2160  DATA 04,AC,09,04,A2,00,B1,03,C9,7B
2170  DATA 30,03,8D,0A,04,8A,18,69,77,91
2180  DATA 03,20,4B,17,E8,E0,03,D0,E9,60
2190  DATA END,10670 ,2080 ,2180
~190  DATA AD,07,04,85,03,AD,08,04,85,04
2200  DATA AC,09,04,A9,20,91,03,20,4B,17
2210  DATA A9,20,91,03,20,4B,17,A9,20,91
2220  DATA 03,60,A2,24,BD,94,10,9D,AB,BB
2230  DATA BD,70,10,9D,D3,BB,CA,D0,F1,60
2240  DATA 20,78,15,AE,F1,7F,A9,7D,9D,CB
2250  DATA BB,CA,D0,FA,20,AF,15,A9,DB,8D
2260  DATA 07,04,A9,BD,8D,08,04,A9,22,8D
2270  DATA 09,04,20,97,18,A9,05,8D,02,04
2280  DATA A9,01,8D,0B,04,A2,19,BD,B8,10
2290  DATA 9D,C8,BC,CA,D0,F7,AD,08,02,C9
2300  DATA END,11783 ,2190 ,2290
2300  DATA B3,F0,16,20,10,18,20,2A,18,20
2310  DATA 6D,18,AE,F5,7F,A0,FF,88,D0,FD
2320  DATA CA,D0,F8,F0,E3,A9,01,8D,10,04
2330  DATA A9,00,8D,CA,BC,60,55,55,55,55
2340  DATA 55,55,55,55,55,55,55,55,55,55
2350  DATA 55,55,55,55,55,55,55,55,55,55
2360  DATA 55,55,55,55,55,55,55,55,55,55
2370  DATA 55,55,55,55,55,55,55,55,55,55
2380  DATA 55,55,55,55,55,55,55,55,55,55
2390  DATA 55,55,55,55,55,55,55,55,55,55
2400  DATA 55,55,55,55,55,55,55,55,55,55
2410  DATA END,10876 ,2300 ,2400
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PCN Billboard

Atari 400/800 software. Missile Command, QIX, Asteriods — £10 each. Batty Builders, Curse of Crowley Manor — £5. I. Coxon, Edelweiss, Common Platt, Purton, Swindon, Wiltshire. SN5 9NZ.

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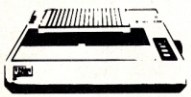

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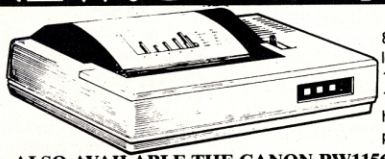

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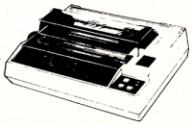

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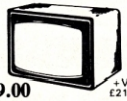

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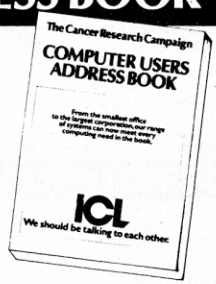

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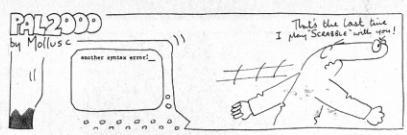
It's nothing really . . .

Blank look — the ICL PC.

It isn't often that we're able to give Britain's premier computer company, ICL, a patriotic plug. Last week it looked as though the chance might have come, when an ICL press release dropped through the letter-box — but all it contained was a blank sheet of paper.

After a few moments' thought it dawned on us that the fact that there was nothing on the paper might not be an accident. Could this be ICL's projected profits for the coming year? Or its plans for pulling the rug out from underneath the IBM PC?

It makes you wonder how seriously the company takes its own advertising slogan: 'We should be talking to each other.'



All about eggs

Every so often a *PCN* journalist has to step back from the job in hand, the hurly-burly of the UK micro scene, in order to attend a press conference.

At these events companies assemble the press and tell them stories, with blandishments like drinks and lunch. Next week a free-ranging *PCN* hack will be present at such a gathering, organised by the British Egg Industry Council.

This will apparently involve two computer programs. It also involves, at 1.00 pm, 'sandwich lunch'. The British Egg Industry Council? We'll let you know what's in the sandwiches next week.

A letter for Evelyn who?

Thanks to Kate Harris for her letter last week on the exotic subject of a Caribbean trade show. Miss Harris addressed her letter 'for the attention of Ms Evelyn House' and began it 'Dear Ms House, I refer to your telephone call yesterday afternoon . . .'

But Miss Harris should note that Evelyn House is the name of our building, not of a member of the tireless staff of *PCN*. It may have been said that talking to *PCN* is like talking to a brick wall, but four brick walls, several floors, internal partitions and a sub-tropical climate? No.

SYNTAX ERRORS

Last week we gave an incorrect number for Oric's Technical Services department. The number to call for technical details is 01-755 1133 and there is a direct line on 01 755 0188.

In our games reviews last week we inadvertently bounced up the price of Mirrorsoft's new BBC program *Hi Bouncer* to £9.95. This is the disk price; the cassette version retails at £6.95.

Our review of the Alpha 10 hard disk unit for the IBM PC was a little misleading. The Alpha 10 will in fact *run* Lotus 1-2-3, although it isn't possible to run the program *from* the Alpha 10. It is also possible to change the dwell time factor without formatting the disk at the same time.

NEXT WEEK

In on the ACT — *We look behind the scenes at ACT and its expanding Apricot family.*
Adventure time — *What's new in the world of graphics adventures.*
Bottom line — *Two in fact, as we show you how to* PRINT *into the foot of your Spectrum's screen.*
BBC Break — *Take advantage of this invaluable utility to protect the variables after Breaking a BBC program.*
VW for IBM — *We Pro-Test Volkswriter, the word processing package for the IBM People's Computer (PC).*
EPROM concert — *For ambitious Dragon users, an EPROM programming kit – blow-it-yourself.*
Gameplay — *Check up on the latest Spectrum and BBC games in our review section.*

PCN DATELINES

PCN Datelines keeps you in touch with up-coming events. Make sure you enter them in your diary.

Organisers who would like details of coming events included in PCN Datelines should send the information at least one month before the event. Write to PCN Datelines, Personal Computer News, 62 Oxford Street, London W1A 2HG.

UK EVENTS

Event	Dates	Venue	Organisers
IBM System User Show	Sept 3-5	Olympia, London	EMAP International Exhibitions, 01-837 3699
Concerned Technology in Education International Conf and Exhbn	September 3-7	Meadowbank Stadium, Edinburgh	Mary Pipes, Michael Joyce Consultants Ltd, 01-836 6801
Hampshire Computer Fair	Sept 6-7	Guildhall, Southampton	Testwood Exhibitions, 0703-31557
Walthamsoft '84	September 8	Walthamstow, London	London Exhibitions and Promotions, 01-554 5039/3498
PCW Show	Sept 19-23	Olympia, London	Montbuild, 01-486 1951
Computer Communication & Control	Sept 26-28	Brighton Centre	Institution of Electrical Engineers, 01-240 1871
Computer Technology Exhibition — Comtec	October 3-5	Spennymoor, co. Durham	Industry Section, Sedgefield District Council, 0388-816166
Computer Graphics FX Exhibitions	October 9-11	Wembley, London	Online Conferences Ltd, 01-868 4466
Apricot & Sirius Computer Show	October 16-18	Manchester	Paradox Group Ltd, 01-241 2354

OVERSEAS EVENTS

Event	Dates	Venue	Organisers
International Exhibition of Data Processing, Communication Telematics & Office Org. — SICOB	Sept 19-28	Paris, France	French Trade Exhibitions, 01-439 3964
SE Asia Regional Computer Conference	Sept 24-27	Hong Kong	Industrial & Trade Fairs International, 021-705 6707
Caribbean Computer & Communications Exhibition and Conference — Caribecom	September 25-27	San Juan, Puerto Rico	AESI Ltd, 01-379 7628

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MARKETING AND PORTABILITY Although **White Lightning** uses an integer FORTH as its host language, programs can be written in a combination of BASIC, FORTH, IDEAL and machine language.

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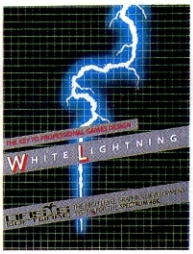
SPRITE DESIGN White Lightning, comes complete with a separate 20K program for developing the Sprites used in the main system. Not only can you use this to design your own Sprites from scratch, it also comes complete with 168 pre-defined characters covering games like **Asteroids, Pac-Man, Assault Course, Defender, Space Invaders, City Bomber, Lunar Lander, Frogger, Centipede, Donkey Kong** and many, many more. These characters are ready to use or can be enhanced. And Sprites can be saved to tape between editing sessions before being finally loaded into the main program.



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